ADD-vantage

A.D. H.D.

FAMILY SUPPORT GROUP MALTA

Attention Deficit/Hyperactivity Disorder Newsletter

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Dear Members,

It has been many months since the last Newsletter was issued, twelve in fact! And I appeal to any of you members who are proficient with a computer to give me a call and offer to lend a hand since it is becoming increasingly more difficult for me to find the time to issue them.

This year our AGM produced two new Committee Members, Albert Gruppetta and Pauline Busuttil Domenici. Welcome, and thanks. Our first task is to finalise the arrangements for the Behaviour Modification Course that is to start in July. Families have already been screened and the parents will be notified shortly of their acceptance. The next task ahead of us is the INSERT Course for teachers which is on 7th, 10th and 11th July. A big thank you in advance goes to those parents and the two boys who are going to speak to the teachers during this course.

Then of course, last but by no means least, is the visit of Prof. Eric Taylor on 25th November. He will be talking to the medical profession about treatment and medication and naturally there will be a separate talk for parents in the evening. Please make a note in your diaries from now for this very important occasion. Prof. Taylor is Director of the Institute of Psychiatry and Director of Psychiatry at the Maudsley Hospital in London and we are extremely lucky to be having him here.

If anyone is interested in helping out on the day or knows of someone who can sponsor an advert or refreshments, please do give us a ring as every little bit helps.

Until the next Newsletter,
The Editor

UP CLOSE: The Medication Debate

Is medication the best way to manage ADHD?

Whether one accepts ADHD as a neurobiological disorder influences the controversial question of how, or even whether, to treat it. At the centre of the controversy is the increasingly common practice of treating ADHD by prescribing psychotropic medications like Ritalin to children. The question couldn't be more politically charged.

The number of children prescribed medications to manage ADHD has risen sharply in the last decade. According to estimates from the U.S. Drug Enforcement Administration, prescription rates for Ritalin and drugs like it have risen by as much as 700 percent since the early 1990s. Critics argue that these statistics reveal an alarming trend toward "quick fixes" in place of real solutions for children's behavioural problems. Others insist that children with ADHD are finally getting the help they need.

Proponents of medication insist that there is a clear link between abnormal brain chemistry and the inattentive and impulsive behaviours that define ADHD. Studies have shown that people with ADHD have less of the neurotransmitter dopamine in their brains than do other people. This chemical messenger, when present, is thought to cause the brain to be more aware and more focused. In people with ADHD, it appears the brain has more difficulty maintaining dopamine levels and so is less capable of keeping its focus. According to medication proponents, stimulants like Ritalin work to maintain dopamine levels.

The long-term risk to children who take stimulant drugs to manage ADHD is unknown; this is one of the few points on which there is some agreement. However, opponents of ADHD medications for children argue that this is one experiment that we should not be conducting. The potential risks are far too great, they say. On the other hand, experts who advocate the use of medications for treatment of ADHD argue that over the last 60 years since Ritalin was first used, no long-term side effects have arisen. They add that parents must also weigh the risks against the potential negative consequences of not giving their children medication if, in fact, they would benefit from it.

No end is in sight to this debate. Opinions abound on everything from whether or not the disorder exists, to the smallest detail regarding medication dosage. And unfortunately, there are very few hard facts to substantiate many of the opinions. So, how can parents make informed choices about ADHD treatment options?

While many experts consider medication a good potential treatment for ADHD-like behaviours, very few recommend it as the first or only step. They urge parents, educators, and family doctors to first rule out other causes for behavioural problems at school or at home. Far too often, problems that look like ADHD are masking other issues, including language or memory difficulties, learning disabilities, emotional disorders, or possibly hearing and vision problems. These underlying problems, many experts agree, often result in children being misdiagnosed with ADHD and prescribed medication that won't help them.

For parents who ultimately consider medication for a child, one study published in 1999 by the National Institute of Mental Health clearly shows that stimulant drugs like Ritalin can be effective for some children. However, it also noted that medication paired with strategies may be even more effective.

YOU FEEL GOOD, especially the thought at the end.

1. Falling in love.
2. Laughing so hard your face hurts.
3. A hot shower.
4. No lines at the supermarket
5. A special glance.
6. Getting mail
7. Taking a drive on a pretty road.

8. Hearing your favorite song on the radio.
9. Lying in bed listening to the rain outside.
10. Hot towels fresh out of the dryer.
11. Chocolate milkshake (or vanilla or strawberry!) 12. A bubble bath.
13. Giggling.
14. A good conversation.
15. The beach
16. Finding a dollar bill in your coat from last winter.
17. Laughing at yourself.
18. Holding a newborn baby.
19. Midnight phone calls that last for hours.
20 . Running through sprinklers.
21. Laughing for absolutely no reason at all.
22. Having someone tell you that you're beautiful.
23. Laughing at an inside joke.
24. Friends.
25. Accidentally overhearing someone say something nice about you.
26. Waking up and realizing you still have a few hours left to sleep.
27. Your first kiss (either the very first or with a new partner).
28. Making new friends or spending time with old ones.
29. Playing with a new puppy.
30. Having someone play with your hair.
31. Sweet dreams.
32. Hot chocolate.
33. Road trips with friends.
34. Swinging on swings.
35. Making eye contact with a cute stranger.
36. Making chocolate chip cookies.
37. Having your friends send you homemade cookies..
38. Holding hands with someone you care about.
39. Running into an old friend and realizing that some things (good or bad) never change.
40. Watching the expression on someone's face as they open a much desired present from you.
41. Watching the sunrise.
42. Getting out of bed every morning and being grateful for another beautiful day.
43. Knowing that somebody misses you.
44. Getting a hug from someone you care about deeply.
45. Knowing you've done the right thing, no matter what other people think.

Friends are angels who lift us to our feet when our wings have trouble remembering how to fly

Attention-Deficit Hyperactivity Disorder (ADHD)

Kytja K. S. Voeller, MD

The following is a small extract from an article by Dr. Voeller which may be of interest to parents and/or professionals.

Approaches to the diagnosis and treatment of attention-deficit hyperactivity disorder (ADHD) are undergoing a major change as a result of information from studies on the genetics of ADHD and the use of new neuroimaging technologies. Moreover, pharmacogenomics, although still in its infancy, will provide a basis for much more sophisticated treatment strategies for ADHD, particularly once more information is available about the genetics of ADHD. Even at this point in time, there is some pertinent information available that, although not ready for application in clinical settings, nonetheless provides a broader perspective for the clinician. In terms of etiology, ADHD is a neuropsychiatric disorder. There is a genetic basis in about 80% of the cases, involving a number of different genes, and in about 20% of the cases, ADHD is the result of an acquired insult to the brain. Some individuals likely have both genetic and acquired forms. Although medication works well in many cases of ADHD, optimal treatment of ADHD requires integrated medical and behavioural treatment. The family plays a crucial role in the management of children with ADHD. Because there is often a very high degree of comorbidity between ADHD and learning disabilities, teachers also have a great deal to contribute in the day-to-day management of these children. Early recognition and treatment prevent the development of more serious psychopathology in adolescence and adulthood.

Introduction

Many children with a learning disability also have attention-deficit hyperactivity disorder (ADHD), which can significantly impair the

child's ability to absorb and make use of educational experiences and to function effectively in both academic and social environments. Awareness of this association, which should lead to early diagnosis and appropriate treatment of ADHD, is an extremely important part of the management of the learning-disabled child. Appropriate management of ADHD helps the child deal with areas of deficit and use compensatory skills effectively.

ADHD in Boys and Girls

There are more boys than girls diagnosed with ADHD. In surveys dealing with children referred to clinics, the ratio of boys to girls varies from 6:1 to 12:1. In epidemiologic samples, the male-to-female prevalence ratio is much lower, 3:1, suggesting that ADHD in girls tends to be underdiagnosed. On the one hand, girls do not manifest disruptive behaviours to the extent seen in boys; girls with ADHD have half of the rates of conduct disorder and oppositional defiant disorder but are much more likely to have significant social problems. Compared with boys with ADHD, they manifest more emotional distress, have higher rates of depression and anxiety, are highly vulnerable to stress, and have poor self-esteem and a limited sense of control. However, girls show an equivalent degree of prefrontal executive function impairment. On the other hand, compared with unaffected girls, girls with ADHD are significantly impaired on the Global Assessment of Functioning Scale, as well as in cognitive functioning and academic performance. They have higher rates of disruptive behaviour disorders, are vulnerable to alcohol and drug dependence, and are at risk of academic failure.

Comorbid Conditions

It is rare to encounter a child with "pure" ADHD without other emotional or learning problems because ADHD is associated with an extremely high rate of comorbid psychiatric disorders and is usually accompanied by a learning disability. Relatives of children with ADHD are also at higher risk of neuropsychiatric disorders than relatives in the control families.[20,22] Conduct disorder, oppositional defiant disorder, major affective disorder (depression or bipolar disorder), anxiety disorder, including obsessive-compulsive disorder, and Tourette syndrome are all such comorbidities. Teenagers with ADHD, particularly untreated ADHD, are at risk for drug and alcohol abuse. In addition, many individuals with mental retardation and autistic spectrum disorders (ie, pervasive developmental disorder, autistic disorder, Asperger's syndrome, and nonverbal learning disability) also often have associated ADHD. Language disorders are frequently associated with ADHD. In one report, 45% of children with ADHD had at least one element of language impairment, and children with both specific language impairment and ADHD appeared to have greater difficulty with verbal short-term memory. (Also see the article by Sundheim and Voeller in this issue for further discussion of this association. Language impairment in ADHD has been considered by some to reflect a common underlying prefrontal executive function deficit.

Learning disabilities (dyslexia and dyscalculia in particular) are frequently associated with ADHD. In the Remediation of Dyslexia study, we observed that of the 60 children selected because of severe phonologic awareness deficits, 80% met the criteria for ADHD. Boys with ADHD and learning disability tended to have more serious executive function deficits than boys who were not learning disabled.

Motor incoordination is often associated with ADHD and can be an early and prominent feature in the preschool child who will develop ADHD symptoms. Kadesjo and Gillberg in Scandinavia pointed out the syndromic nature of this combination—deficits in attention, motor control, and perception (DAMP).

Neuroanatomy and Physiology of ADHD

Behaviorally, ADHD is a disorder of self-regulation, which implicates some sort of dysfunction of the frontal-subcortical system. Many magnetic resonance imaging (MRI) morphometric studies (ie, studies involving measurements of various brain regions) have been conducted using different techniques and different populations (including subjects from different regions of

the globe). These studies have identified relatively consistent differences in the brains of children with ADHD compared with those of normal controls. A large, well-designed longitudinal study involving 544 MRIs from children with ADHD and age- and sex-matched controls has provided evidence that ADHD is associated with an atypical pattern of brain development that appears in early childhood. The major findings of these studies are summarized as follows:

1. Total cerebral volume is smaller in individuals with ADHD and in controls. There is a small but significant reduction (on the order of 5%) in mean total cerebral volume or intracranial volume. In one study comparing boys with ADHD, their unaffected male siblings, and matched controls, the subjects with ADHD had a significant (4%) reduction in intracranial volume. Their unaffected siblings had a 3.4% reduction compared with controls (a statistical trend). Cortical right prefrontal grey matter and left occipital grey and white matter were reduced in the subjects with ADHD and their siblings. This suggests that changes in cerebral volume need to reach a certain crucial level before they become obviously symptomatic. Moreover, this study strongly supports the genetic basis of ADHD.

2. Frontal lobe volume is smaller in persons with ADHD. Brain regions involved in self-regulation (executive function) show differences from those of controls. In most studies, the frontal lobes or subregions of the frontal lobes were found to be smaller in subjects with ADHD than in controls. In one study, the inferior portions of dorsal prefrontal cortices and anterior temporal cortices, bilaterally, were reduced in subjects with ADHD.

3. Various regions of the basal ganglia, particularly the caudate nucleus, have been reported to be smaller in children with ADHD compared with controls. Studies on normal individuals have shown that the caudate decreases in size as the child matures (a manifestation of the normal "pruning" of neurons seen in many parts of the brain during development). Children with ADHD start out with smaller caudate nuclei than controls, and with maturation, there is a further decrease in size. As a result, any difference in size between children with ADHD and controls becomes less apparent with increasing age. (This might explain the variability in size observed in different studies because the age of the subjects varied considerably across these studies.) Other regions of the basal ganglia have also been reported to be reduced in volume in subjects with ADHD relative to controls.

4. Right hemisphere structures are affected more than left hemisphere structures. In normal child and adult populations, the right frontal area is larger than the left frontal area. Given the important role that the right hemisphere plays in regulating attention and the deficits seen in ADHD, it would not be surprising to observe reduction in right frontal lobe volume. This was not a consistent finding, but it was noted in a number of studies. In some studies, a decrease in the right frontal grey-matter volume was noted, or changes in volumes of certain subcortical structures were more prominent on the right.[42,53] It is possible that the reduction in size is due to the reduction of global brain volume, as suggested by Castellanos et al. In normal adults, the right caudate is larger than the left caudate. However, based on the large National Institute of Mental Health study of children with ADHD, the right caudate nucleus is smaller than the left caudate nucleus. This asymmetry was not necessarily observed in all studies, but they generally involved many fewer children and were not longitudinal.

5. There is a relative decrease in the size of the cerebellum. The cerebellum also participates in the regulation of executive function as a result of its reciprocal connections to the prefrontal cortex. The decreased size of the cerebellum in children with ADHD was initially described by Castellanos et al and has been corroborated in a number of other studies.

6. A number of studies reported a reduction in the area of the anterior or posterior corpus callosum. However, in the large National Institute of Mental Health study, this was not confirmed.

It is worth noting that treatment with psychostimulants was not responsible for the reduction in various brain areas because these findings were also noted in children who were drug naive. Interestingly, children on psychostimulant treatment actually had somewhat greater white-matter volumes than those who had not been treated.

In summary, there is now much research suggesting that, when carefully examined, groups of children with ADHD have small but significant reductions in total brain volume and in the various regions of the brain that are involved in the regulation of attention and impulsivity. This would suggest that the behaviours seen in children with ADHD are not simply the result of environmental factors or some sort of distortion of perception on the part of parents and teachers, but rather a very real brain dysfunction.

Functional Neuroimaging Studies

Functional neuroimaging studies have been used to study individuals with ADHD and controls and are consistent with the morphometric findings. These studies also revealed dysfunction of the prefrontal-subcortical system, often with greater involvement of areas of the right hemisphere. [Note: Functional neuroimaging studies involve a number of different techniques: positron emission tomographic (PET) scans, functional magnetic resonance imaging (fMRI) scans, single photon emission computerized tomography (SPECT), and magnetic resonance spectroscopy (MRS). The common feature of these studies is that they enable us to examine the brain while it is performing various cognitive or behavioral tasks and provides a remarkable window in the understanding of brain function.] A study of adolescents with ADHD using positron emission tomography (PET) with fluorodeoxyglucose revealed that global cerebral glucose metabolism in the adolescent girls with ADHD was 15% lower than in the control girls and 19.6% lower than in boys with ADHD. Brain regions in which this lower activity was observed were the right frontal premotor cortex and right temporal cortex. Activity was decreased bilaterally in the posterior putamen and middle cingulate cortex. These findings were not confirmed on a subsequent study, but it was noted that the degree of sexual maturation was probably a variable that had not been taken into consideration. A study of adults (18.1 to 50.8 years of age) with ADHD by the same investigators demonstrated that global cerebral glucose metabolism was reduced in women with ADHD but not in men with ADHD or in control men or women. Women with ADHD demonstrated better performance on the auditory attention task with increasing age. These findings suggest a complicated interaction between gender, age, and hormonal effects. In another PET study of adolescents in the age range of 13 to 14 years, in which the effects of sexual maturation were controlled, subjects with ADHD had a higher accumulation of dopa decarboxylase (indicating a high level of dopamine synthesis) in the right midbrain than controls. Although this study was not without methodologic problems (it involved a small number of subjects, the "controls" were siblings of the ADHD subjects, and the findings were significant only when computed without adjustments for multiple statistical comparisons), it still suggests that the dopaminergic system is dysfunctional in persons with ADHD.

When children are asked to perform a task that places demands on the frontal executive system, those with ADHD have atypical patterns of activation. In one study, children with ADHD and controls were studied using functional MRI during a go/no-go task. [*Note:* Go/no-go tests involve establishing a pattern of response to a specific "go" signal and then inhibiting the response when a "no-go" signal is presented. It is one test of executive function in that it requires the ability to inhibit an established pattern of behaviour. One example involves making two taps with a hand when the examiner makes one, and then when the examiner makes one tap, the subject makes none. Children have greater difficulty with these tasks than adults, but the child with ADHD has much greater difficulty than other children of the same age.] In general, functional MRIs on children performing tasks that demand executive function control have somewhat different patterns of activation than are seen in those of adults. However, children with ADHD do not activate frontostriatal networks to the same extent seen in the children without

ADHD but, rather, manifest a more diffuse activation pattern than was seen in controls, suggesting that the development of frontostriatal circuits was delayed in children with ADHD. In another functional MRI study involving children with ADHD and controls performing two somewhat different types of go/no-go tasks, children with ADHD made more errors than controls. In one task, children with ADHD activated frontal areas to a greater extent than controls. Although this is not consistent with the findings in other studies, it is possible that the task required the subjects with ADHD to exert more effort than controls. (In this study, other brain regions were not examined so that there was no opportunity to see the diffuse activation pattern described in the Durston et al. study. After receiving methylphenidate (Ritalin), both groups of children made fewer errors, with a highly significant improvement in the ADHD group. Methylphenidate increased frontal activation in both groups and increased striatal activation in the children with ADHD but decreased it in the controls.

Some SPECT studies have identified decreased activity involving the temporal lobe and cerebellum in some children with ADHD.[74] This would support the observation that the dysfunction in ADHD involves not only the frontal-subcortical circuits but also the integration of temporal lobe and cerebellar function in emotion, cognition, and motor planning.

A decision-making gambling task developed for patients with prefrontal deficits was administered to adults with ADHD. Subjects were required to choose between immediate rewards with the risk of high long-term losses and lower immediate gains with lower long-term losses. The ability of adults with ADHD to tolerate delays in gratification was studied using PET while they performed the gambling task. A control task was also employed. Adults with ADHD did not activate the prefrontal cortex during the decision-making process to the same extent as did the controls and did not activate the anterior cingulate and hippocampus, which are involved in emotional arousal and memory. However, the subjects with ADHD activated the posterior right anterior cingulate more than the controls.

In summary, neuroimaging studies reveal that children and adults with ADHD activate frontal subcortical structures to a lesser extent than control subjects. Although the pattern of activation in children with ADHD is somewhat more diffuse, they, like adults with ADHD, do not activate areas involved with emotion and memory to the same extent that controls do. This is consistent with the observed difficulty that these individuals have in motivation and arousal.

Electrophysiology

Electroencephalographic (EEG) studies of children with ADHD reveal an excess of slow-wave (theta) activity consistent with decreased alertness and underarousal. [Note: EEGs are "brain wave" studies that record electrical activity of the brain by means of electrodes to the scalp. Different patterns are noted in sleep and wakefulness. Increased slowing during wakefulness is consistent with a lower level of alertness or disturbance of cerebral function.] These EEG patterns correctly classify over 90% of children with ADHD and normal controls. However, although there are clear-cut differences between the EEG patterns of children with ADHD and those of controls, there is enough heterogeneity in the ADHD group to limit the diagnostic efficacy of this technology. Comparing the EEG patterns of children with ADHD and controls, group differences were found in the mean frequency of the total EEG, as well as the specific amounts of activities of different frequencies (theta, alpha, and beta), the ratios of these different frequencies, and the coherence patterns across the three groups. These EEG patterns suggest reduced cortical differentiation and specialization in ADHD, more prominently in children with the hyperactive or impulsive type than in those with the inattentive type. Moreover, children with the inattentive type of EEG were found to have two different EEG patterns, one consistent with hypoarousal (reminiscent of the sluggish cognitive tempo type described by Lahey et al. and one consistent with a maturational lag.

In summary, quantitative EEG patterns appear to demonstrate differences in children with ADHD and those without ADHD. However, diagnostic accuracy is not much better than the clinical assessment and requires specialized equipment and technical expertise. Given the possibility that

there can be different EEG patterns seen in children with ADHD, this technique appears to have limited application at this time; however, it might be useful in determining the response to medication and possibly will be more meaningful once ADHD genetics are unraveled.

In summary, electrophysiologic studies of children with ADHD reveal atypical brain wave patterns, which suggest dysregulation of arousal and attention.

Etiology of ADHD

ADHD is a highly heritable disorder. However, it can also be acquired, and some individuals have a combination of genetic and acquired ADHD. At the present time, it is not possible to distinguish between these two types of ADHD—they both look the same, and both usually respond to treatment with the same psychostimulant medication.

Genetics of ADHD

ADHD is, in most cases, of familial origin. Parents with ADHD have a better than 50% chance of having a child with ADHD, and about 25% of children with ADHD have parents who meet the formal diagnostic criteria for ADHD. Twin studies have placed the heritability of ADHD in the range of 80%. In a longitudinal twin study examining the size of genetic and environmental effects on ADHD behaviours based on maternal report at the ages of 3, 7, 10, and 12 years, the estimate of heritability was nearly 75% at each age, with hyperactivity at age 3 years being somewhat less related to later inattention and inattention at age 7 years being quite stable. The genetic factors explained 76% and 92% of the covariance between hyperactivity and inattention.[85] This provides another line of support for the observation that behaviours related to ADHD (inattention to a greater extent than hyperactivity) do not improve with maturation.

ADHD can be considered a disorder of neurotransmitter function, with particular focus on the neurotransmitters dopamine and norepinephrine. There has been extensive research conducted that demonstrates that dopamine is critical in the regulation of learning, as well as maintaining trained or conditioned responses and motivated (goal-directed) behaviors.[Dopamine also plays an important role in working memory, the ability to "keep something in mind" for a brief period of time. Thus, dopamine can modulate neuronal activity related to motor activity that is guided by external cues and is goal directed.[93] Dopamine plays an important role in the function of the prefrontal-subcortical system. Norepinephrine (noradrenaline) is involved in maintaining alertness and attention. Norepinephrine neurons are triggered by novel and important stimuli and are quiescent during sleep. Psychostimulant medications that increase the amount of central dopamine and norepinephrine are typically the most effective way to treat ADHD.

To summarize, dopamine is the neurotransmitter that regulates the system that plays an important function in learning, motivation, goals, drives, and emotion—all of which are crucial to survival. Norepinephrine is the neurotransmitter involved in the detection of those stimuli that are important or novel and maintains the organism in a state of alertness and readiness as needed to process these stimuli. This system appears to be impaired in children with ADHD who have difficulty regulating their own level of alertness and awareness of important stimuli.

Genetic studies of ADHD have focused on genes involved in the regulation of neurotransmitter function, mainly related to dopamine, although some studies have also examined the role of norepinephrine and other neurotransmitters. Many different processes are involved in neurotransmission. These and a list of candidate genes for ADHD are summarized in Table 1 . It is unlikely that a single gene will be linked to ADHD; rather, ADHD might be due to the interaction of several different genes involved in the function of several different neurotransmitters. In addition, individuals' genetic makeup will determine how they will respond to specific medications used to treat ADHD. Thus, we are at the beginning of a process that will not only make it possible to carry out more sophisticated diagnostic processes but will also make it possible to develop more sophisticated and effective approaches to treatment.

Acquired Brain Lesions and ADHD

The behaviors associated with ADHD can also arise from environmental factors that

disrupt normal brain growth, before, during, and after birth. Such insults give rise to behaviors that are indistinguishable from the behaviors seen in ADHD of genetic origin. It is not unusual to see individuals who have both a genetic and an acquired form.

Multiple pre- and perinatal factors can result in ADHD. One such factor is fetal alcohol syndrome, which results in significant inattention, impulsivity, and hyperactivity in the child. Exposure of the fetus to alcohol is associated with a reduction in the volume of the prefrontal and temporal cortices—the brain areas involved in regulation of attention and control of impulsivity. Maternal smoking has been linked with ADHD. Even though women with ADHD are at increased risk of becoming smokers and the child's ADHD might be genetic, exposure of the fetus to cigarette smoking confers an increased risk. One study found a fourfold higher risk of ADHD in the offspring of smokers, even after controlling for maternal ADHD. Metabolic disorders of the mother (eg, diabetes, phenylketonuria) can also result in an ADHD-like picture in the infant.

The dopamine system is exquisitely sensitive to hypoxia, particularly in the fetus or infant. Thus, any events pre- or postnatally that disrupt the flow of blood or oxygen to the brain might set the stage for later ADHD behaviors. This observation is supported both by laboratory studies and a study of ex-premature infants who had documented cerebral ischemia at birth and were re-examined in early adolescence.

Iron deficiency is associated with disruption of the dopamine system and more extensive neurodevelopmental problems. It is rarely a cause of ADHD because most children in the United States receive diets with adequate iron.

Injury to the medial temporal lobe during early development is also associated with ADHD-like behaviors later in development, possibly because of the disruption of dopamine regulation in the dorsolateral prefrontal cortex. This has been shown in nonhuman primates and children with temporal lobe cysts.

Hyperbilirubinemia (jaundice) in the newborn period can evolve into an ADHD-like picture later in childhood. In the past, before effective treatments were developed, neonatal hyperbilirubinenia resulted in severe and irreversible damage to the basal ganglia (specifically the globus pallidus and subthalamic nucleus). (Bilirubin is a mitochondrial poison and affects calcium homeostasis, resulting in neuronal death.) However, it has become apparent that even moderate levels of bilirubin in otherwise healthy infants might not be as benign as previously believed.

Any injury to the brain that affects the prefrontal-subcortical circuits can result in an ADHD-like picture. Traumatic injury often involves damage to the tips of the frontal lobes or shearing of white-matter tracts and often results in ADHD-like behaviors. In one study comparing monozygotic twins who were discordant for ADHD, caudate lesions were observed in the twin with ADHD. Similarly, children who have suffered strokes, particularly those involving subcortical areas in the prefrontal-subcortical circuits, not infrequently manifest ADHD-like behaviors. In one study, nearly half of the children developed ADHD following stroke, and there was a strong correlation between lesions of the putamen and ADHD symptomatology. Meningitis and encephalitis are also associated with ADHD-like behaviors. Autoimmune disorders have also been implicated in triggering ADHD-like symptoms in susceptible patients. Pediatric autoimmune neuropsychiatric disorder associated with streptococcus (PANDAS) is linked to Tourette syndrome, obsessive-compulsive disorder, and ADHD. Lyme disease has also been associated with a number of neuropsychiatric symptoms, including those of ADHD.

The role that environmental factors play in ADHD should not be minimized. Early deprivation can result in ADHD symptoms in later childhood (increased rates of attention deficit and hyperactivity have been observed in children who were raised in institutions). These children also have a somewhat different set of associated psychiatric disorders than children with genetic ADHD and have disturbed attachment. Children who grow up in chaotic environments often have difficulty regulating attention, impulsivity, and emotionality. The risk of ADHD is proportional to the number of adverse factors (eg, poverty, maternal psychopathology, paternal criminality) that are present.

The second part of this article will be in the next issue of this magazine.

GREAT QUOTES BY GREAT LADIES

Inside every older lady is a younger lady -- wondering what the hell happened.-Cora Harvey Armstrong-

Inside me lives a skinny woman crying to get out. But I can usually shut her up with cookies.

The hardest years in life are those between ten and seventy.-Helen Hayes (at 73)-

I refuse to think of them as chin hairs. I think of them as stray eyebrows.-Janette Barber-

A male gynecologist is like an auto mechanic who never owned a car. -Carrie Snow-

Laugh and the world laughs with you. Cry and you cry with your girlfriends.-Laurie Kuslansky-

A man's got to do what a man's got to do. A woman must do what he can't. -Rhonda Hansome-

The phrase "working mother" is redundant.-Jane Sellman-

Every time I close the door on reality, it comes in through the windows. -Jennifer Unlimited-

Whatever women must do they must do twice as well as men to be thought half as good. Luckily, this is not difficult.-Charlotte Whitton-

Thirty-five is when you finally get your head together and your body starts falling apart.-Caryn Leschen-

I try to take one day at a time -- but sometimes several days attack me at once.-Jennifer Unlimited-

If you can't be a good example -- then you'll just have to be a horrible warning.-Catherine-

When I was young, I was put in a school for retarded kids for two years before they realized I actually had a hearing loss. And they called ME slow!-Kathy Buckley-

I'm not offended by all the dumb blonde jokes because I know I'm not dumb -- and I'm also not blonde.-Dolly Parton-

If high heels were so wonderful, men would still be wearing them. -Sue Grafton-

I'm not going to vacuum 'til Sears makes one you can ride on.-Roseanne Barr-

When women are depressed they either eat or go shopping. Men invade another country.-Elayne Boosler-

Behind every successful man is a surprised woman.-Maryon Pearson-

In politics, if you want anything said, ask a man. If you want anything done, ask a woman.-Margaret Thatcher-

I have yet to hear a man ask for advice on how to combine marriage and a career.-Gloria Steinem-

I am a marvelous housekeeper. Every time I leave a man, I keep his house

This is a review of a study on the contribtuion that Executive Function Deficits (EFDs) make to the academic struggles experienced by children with ADHD. Executive functions refer to those mental operations that help to organize and direct complex behavior, and involve such things as goal setting, planning, reasoning, cognitive flexibility, etc. In some current theorizing about ADHD, EFDs are seen as underlying the symptoms used to define the disorder - attention problems and hyperactivity-impulsivity - and thus as a more "primary cause" of the difficulties that individuals with ADHD experience. Despite this theorizing, however, there has been little research examining how common EFDs are in children with ADHD, and whether the presence of EFDs is associated with poorer academic and other outcomes. The answer to these questions have potentially important clinical applications, and I am thus pleased to report these results of this study to you. (David Rabiner, Ph.D. Senior Research Scientist - Center for Child and Family Policy - Box 90545 Duke University Durham, NC 27708)

** ADHD, Executive Functioning, and Academic Achievement **

Although ADHD can create difficulties in many areas of a child's life, the adverse impact it frequently has on academic functioning is especially problematic. This has been documented in numerous studies, where it has been shown that children with ADHD are less likely to complete high

school, more likely to repeat a grade, more likely to be placed in special education classes, and less likely to achieve to their potential.

Despite this general pattern of findings, not all children with ADHD experience significant academic struggles. In fact, a number manage to do reasonably well despite the disorder. What might account for the wide range of variability in academic outcomes for children with ADHD? Why do some achieve reasonable levels of academic success while many others struggle mightily, regardless of how bright they may be?

One factor that may help explain the variability in academic outcomes in children with ADHD is the presence vs. absence of executive functioning deficits (EFDs). Executive functions (EFs) can be thought of as the decision-making and planning processes that help to control and direct our behavior. For example, when a child has a long-term assignment to complete, the executive functioning tasks involved would include dividing the task into sub-task, making a plan for completing those tasks, and monitoring performance along the way. Although no single list of EFs is universally agreed upon, most experts would agree that important EFs include such abilities as planning, reasoning, working memory (i.e., holding information in memory for later use), inhibiting behavior that may bring immediate rewards in pursuit of a long-term goal, some aspects of attention, and shifting cognitive sets, i.e., flexibility in thinking.

These EF skills are believed to be critically important for complex human behavior because they serve to organize and guide behavior in flexible and adaptive ways. A number of studies have demonstrated that children with ADHD exhibit EFDs relative to children without the disorder. In fact, current conceptualizations of ADHD emphasize that EFDs may represent the core deficits associated with ADHD, and that symptoms used to define the disorder - inattention and hyperactivity-impulsivity - are the result in many instances of these core EFDs.

Despite the important role that EFDs play in current theorizing about ADHD, very little is known about the clinical implications of EFDs in children and adolescents with ADHD. For example, there has been little research on whether EFDs and core ADHD symptoms contribute independently to academic difficulties as well as the other problems that many children/teens with ADHD experience. In fact, one distinct possibility is that in the absence of EFDs, children with ADHD may not experience the severe academic struggles that are regularly associated with the disorder.

If this were found to be true, then routinely assessing children with ADHD for EFDs could alert parents and clinicians to when academic problems are especially likely to develop. This knowledge could enable them to make extra efforts to prevent this from occurring. It is also possible that ADHD with and without EFDs is associated with different outcomes in other important emotional and behavioral domains and this could also have important implications for treatment planning.

This interesting issue was the focus of a study published recently in the Journal of Consulting and Clinical Psychology (Biederman et al., (2004). Impact of executive function deficits and attention deficit/hyperactivity disorder on academic outcomes in children. JCCP, 72, 757-766. Participants in this study were children and adolescents with (n=259) and without (n=222) ADHD. Unlike many studies in the literature, girls and boys were represented in relatively equal numbers.

Participants ranged in age from 6-17 and received a variety of assessment measures in the study. These included:

- psychiatric assessments to establish the ADHD diagnosis as well as the presence of co-occurring emotional and behavioral disorders;

- psychosocial assessments to assess social difficulties at school and in interactions with peers, siblings, and parents;

- cognitive assessments to assess IQ and academic achievement level in reading and math; and,

- neuropsychological assessments specifically intended to assess key elements of executive functioning. The neuropsychological battery included 6 measures to assess a range of EFs including planning and organizational skills, reasoning, cognitive flexibility, working memory, ability to inhibit impulsive responding, and certain components of attention.

For each EF tested, participants were classified as having a deficit if their performance fell in the bottom 7% for children/teens who comprised the non-ADHD sample. Participants were then classified as having an overall EFD if they scored in this range on 2 or more of the EFs that were assessed. Participants who scored poorly on 1 or fewer EF measure were considered "normal" in regards to their overall executive functioning. The rational behind this classification procedure is that whereas impaired performance on only a single neuropsychological test may be due to chance, two or more impaired tests would likely be interpreted as a deficit by most clinicians.

Participants' classification as EFD vs. non-EFD groups was combined with their diagnostic status for ADHD to form 4 groups: control participants without EFD (n=196); control participants with EFD (n=26); ADHD without EFD (n=173); and ADHD with EFD (n=86). Once these groups were identified, the researchers examined how they compared on the academic, social, and psychiatric outcomes that were assessed. As noted above, they were especially interested in whether EFDs in children/teens with ADHD was reliably associated with poorer academic, psychiatric, and social functioning.

RESULTS

The researchers first tested whether EFDs were more common in children and teens with ADHD than in control participants. Thirty-three percent of participants with ADHD had EFDs compared to only 12% of control participants; this difference was statistically significant.

Next, they examined whether particular clinical aspects of ADHD were associated with EFDs. Participants with ADHD and EFDs did not differ from those with ADHD but without EFDs in their age of onset of ADHD or the number of hyperactive-impulsive symptoms. They did, however, have slightly more inattentive symptoms, but the average difference was not large (i.e., less than 1 symptom).

EFDs and Academic Functioning

As expected, children with ADHD showed poorer academic performance in a variety of areas compared to control children; this was true regardless of whether or not control children had EFDs. Of greater interest, however, is that within the group of participants with ADHD, the presence of EFDs was strongly and consistently associated with poorer academic performance.

Compared to participants with ADHD and no EFD, those with ADHD + EFD were more likely to have repeated a grade (42% vs. 19%), to be diagnosed with a learning disability (44% vs. 20%), to have lower IQ scores (98 vs. 109), and to have lower achievement in math (85 vs. 99) and reading (92 vs. 106). (Note that for IQ and the achievement scores, the average score is 100.) The differences found for grade retention, learning disability, and achievement in reading and math were evident even after controlling for IQ, SES, and medication status, which suggests that EFDs were the critical variable accounting for the differential performance. Among children without ADHD, those without EFDs tended to perform better, but the differences were not as pronounced and were generally not significant.

EFDs and Other Outcomes

In regards to the other areas assessed, the association between EFDs, ADHD, and negative outcomes was different. Specifically, although participants with ADHD had more negative outcomes than control participants in virtually all areas, the presence EFDs within the ADHD group did not appear to make a difference. Thus, both

groups of participants with ADHD - i.e., those with EFDs and those without - had similar rates of mood disorders (34% vs. 37%), anxiety disorders (32% vs. 40%), disruptive behavior disorders (53% vs. 55%), substance use (10% vs. 9%), and smoking (13% vs. 13%). Except for substance use, these rates were all substantially higher than those reported for control participants, and in no instance did they differ significantly from one another. In regards to the overall measure of social functioning, participants in the 2 ADHD groups were again equivalent and had significantly more difficulties than control participants.

SUMMARY and IMPLICATIONS

Results from this study suggest that EFDs are significantly more common in children/teens with ADHD than in those without the disorder, and that among individuals with ADHD, EFDs increase the risk for grade retention, learning disability, and lower academic achievement.

Furthermore, the greater academic difficulties experienced by children with ADHD who also have EFDs cannot be explained by differences in IQ, SES, medication status, or in the greater severity of core ADHD symptoms. Thus, it appears that EFDs may make an independent contribution to academic problems above and beyond those related to the core symptoms of ADHD alone.

In regards to other psychiatric outcomes and overall social functioning, however, there was no indication that EFDs add to the difficulties that are associated with ADHD alone. The authors note that this does not necessarily mean that EFDs do not add to the risk posed by ADHD in regards to these other negative outcomes. Instead, it is possible that when EFDs are present along with ADHD, it may take longer for this additional risk to become evident, whereas for academic difficulties, the negative impact occurs earlier in development. This, of course, is a hypothesis that would require additional study in order to test.

These findings have potentially important clinical implications in that only about 1/3 of participants with ADHD also had EFDs as defined by the researchers. If these findings were replicated, it would provide a strong indication that routinely screening children newly diagnosed with ADHD for EFDs could be an important addition to ADHD evaluations protocols. To my knowledge, such screening is not typically done, particularly when the diagnosis is being made by primary care physicians who are not generally trained to administer and interpret neuropsychological tests.

The benefit of this screening is that by identifying those children with ADHD who also showed EFDs, more intensive efforts to prevent the development of academic struggles could be initiated. As the authors note, because it is not clear how EFDs respond to standard pharmacological treatment for ADHD, children with ADHD and EFDs may require additional academic intervention to prevent academic failure; they may also required a different type of intervention that is specifically designed to address their executive functioning deficits. Developing and evaluating such intervention efforts remains an important topic for subsequent research in this interesting and important area.

And one for the men? Courtesy of JC. Thanks

Subject: Why Men Are Happier

Men Are Just Happier People-- What do you expect from such simple creatures? Your last name stays put. *The garage is all yours.* Wedding plans take care of themselves. *Chocolate is just another snack.* You can be President. *You can never be pregnant.* You can wear a white T-shirt to a water park. *You can wear NO shirt to a water park.* Car mechanics tell you the truth.
The world is your urinal. You never have to drive to another gas station restroom because this one is just too icky. *You don't have to stop and think of which way to turn a nut on a bolt.* Same work, more pay. *Wrinkles add character.* Wedding dress $5000. Tux rental-$100. *People never stare at your chest when you're talking to them*. The occasional well-rendered belch is practically expected. *New shoes don't cut, blister, or mangle your feet.* One mood all the time. *Phone conversations are over in 30 seconds flat*. You know stuff about tanks. *A five-day vacation requires only one suitcase.* You can open all your own jars. *You get extra credit for the slightest act of thoughtfulness*. If someone forgets to invite you, he or she can still be your friend. *Your underwear is $8.95 for a three-pack.* Three pairs of shoes are more than enough. *You almost never have strap problems in public.* You are unable to see wrinkles in your clothes. *Everything on your face stays its original color.* The same hairstyle lasts for years, maybe decades. *You only have to shave your face and neck.*
You can play with toys all your life. *Your belly usually hides your big hips.* One wallet and one pair of shoes one color for all seasons. *You can wear shorts no matter how your legs look.* You can "do" your nails with a pocket knife. *You have freedom of choice concerning growing a mustache*. You can do Christmas shopping for 25 relatives on December 24 in 25 minutes.

** New Issue - Does Tutoring Help Children with Attention Problems? **

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For children with ADHD, succeeding academically is often especially difficult. In fact, numerous studies have documented that academic underachievement is one of the most frequent consequences of the disorder.

There are a variety of reasons why this may occur. First, traditional instructional methods during elementary school may not be conducive to promoting learning in many students with ADHD.

Second, a significant percentage of children with ADHD also have specific learning disabilities; the presence of a learning disability can make it even more difficult for a child to acquire the basic academic skills needed to succeed in school.

Even when specific learning difficulties are not present, however, problems attending in the classroom can interfere with the acquisition of academic skills and knowledge. This has already been clearly demonstrated in a number of published studies, and one can easily imagine that a child who struggles with attention in class would fail to master these skills as well as classmates, even when the child was equally capable intellectually. As a result, this child would be less prepared to succeed in subsequent grades, and a downward spiral could have already begun.

One plausible approach to prevent this from occurring would be to identify children with attention difficulties during first grade, and provide them with extra assistance so that they acquire the critical skills necessary for academic success. For example, because attention problems may interfere with their mastering critical early reading skills, perhaps specialized tutoring would help them to learn things they would otherwise miss out on, and thus provide a foundation

for more solid academic success.

This was the premise of a study that my colleagues and I reported last year in the *Journal of Abnormal Child Psychology* (Rabiner, Malone, et al.,(2004). The impact of tutoring on early reading achievement in children with and without attention problems. *Journal of Abnormal Child Psychology, 32*, 273-284.). Participants in this study were 581 children who were part of a larger study designed to prevent the development of serious conduct problems in children at risk for this outcome because of early behavior difficulties.

Children randomly assigned to a treatment or control group; those in the treatment group received a comprehensive set of interventions designed to prevent the development of conduct problems. Of particular relevance to this study was 90 minutes of individual reading instruction that they received over the entire first grade year. Children who were randomly assigned to the control group received no such assistance.

All participants completed a standardized assessment of reading ability before and after first grade. In young children, such assessments examine the ability to recognize letters, awareness of letter-sound combinations, and to read simple words. Children who scored poorly on this measure prior to first grade were thus starting out with evidence of difficulty in their early acquisition of important reading skills. The assessment completed at the end of the year allowed us to determine how much progress in reading each child had made.

In addition to these reading assessments, teachers also completed a standardized behavior rating measure on each child at the end of first grade. Among the items rates were the inattentive symptoms of ADHD. This was not intended to provide a formal diagnosis for any child, but simply to quantify the level of attention difficulties during the year that had been observed.

As noted above, half the children received reading tutoring during first grade. This was a fairly intensive intervention and consisted of 3 30-minute sessions per week over the entire year. The tutoring program emphasized a phonics-based, mastery-oriented approach to the development of initial reading skills. Tutoring was provided by paraprofessionals who had received over 40 hours of training in the program and who were closely supervised during the year.

Our particular interest in this study was to examine whether the presence of attention difficulties resulted in tutoring being less helpful, both for children with and without evidence of early reading problems. The primary question of interest was thus whether the benefits children derived from tutoring depended on their level of attention problems. We made the following predictions:

1) Children without early reading problems but with attention problems will fall behind in reading if they do not receive tutoring; this hypothesis was based on prior findings that attention problems interfere with the acquisition of early reading skills.

2) Children without early reading problems but with attention problems who receive tutoring will make adequate progress in reading during the year; this hypothesis reflected our belief that tutoring would provide these children with skills they would otherwise miss out on and enable them to keep pace with their peers.

3) Children with early reading problems but without attention problems who receive tutoring will make excellent progress during the year; this hypothesis reflects the fact that this was a well validated tutoring program that would help children struggling in their early reading development.

4) Children with early reading problems and attention problems who received tutoring would progress less, but would still show clear signs of progress relative to similar children who did not receive tutoring; this hypothesis reflected our belief that although attention difficulties might somewhat undercut the beneficial effects of tutoring, these benefits would still be apparent within this group.

RESULTS

Do the benefits children derived from tutoring depended on their level of attention problems?

The results we obtained indicate the answer to this question is clearly yes. Specifically, we found that at low levels of attention difficulties, children who received tutoring had substantially higher achievement scores after first grade than children who were not tutored. As children's attention difficulties approached the level that is often seen in ADHD, however, the beneficial affects of tutoring were substantially reduced. Because we controlled for a number of other factors that may have influenced children's reading achievement, including IQ, parental involvement in school, there is a strong basis for concluding that attention difficulties were the critical factor in whether or not tutoring was likely to be beneficial.

What about results for our specific hypotheses?

Hypothesis 1 - Children without early reading problems but with attention problems will fall behind in reading if they do not receive tutoring;

This hypothesis was supported. By the end of first grade, children with no early reading problems but who were inattentive during first grade had reading achievement scores that were now significantly below other children.

Hypothesis 2 - Children without early reading problems but with attention problems who receive tutoring will make adequate progress in reading during the year;

We found partial support for this hypothesis. These children did not fall as far behind as children with attention problems who were not tutored, but they also did not make as much progress as children without attention difficulties. In fact, if the trend we observed continued for another year, they would have fallen significantly behind.

Hypothesis 3 - Children with early reading problems but without attention problems who receive tutoring will make excellent progress during the year.

This hypothesis was strongly supported - in fact, by the end of the year, reading scores for these children were no longer significantly below average. This provided clear evidence that the tutoring program was effective for children who entered first grade with early signs of reading difficulty, but who were not inattentive.

Hypothesis 4 - Children with early reading problems and attention problems who received tutoring would progress less, but would still show clear signs of progress relative to similar children who did not receive tutoring.

The results we obtained here were quite unexpected. To our surprise, we found that for children with both early reading difficulties and significant attention problems, there was no evidence of any benefit from tutoring. That is, children with these characteristics were still far below average in reading at the end of first grade, regardless of whether they had been tutored. In fact, those who were tutored did not score any higher than those who were not.

DISCUSSION

We began this study hoping to document that identifying children with attention problems during first grade, and providing these children with specialized tutoring, would enable them to make good progress in the acquisition of early reading skills.

To our surprise and disappointment, however, this was not the case. Although tutoring was quite helpful for students with good attention skills, children with attention difficulties were found to benefit far less. In fact, among children with both attention problems and early reading difficulties, we found no evidence of any benefit from tutoring.

There are several reasons why these results should not be interpreted to mean that tutoring and other forms of specialized academic help are a waste of time for children with ADHD. First, we were not

working with a diagnosed population. Second, participants in this study also had high levels of acting out behavior problems, which is not the case for many children with ADHD. Third, our sample was restricted to first graders and it is quite possible that tutoring older children with attention difficulties would be more beneficial. Fourth, the tutoring we provided was restricted to reading, and tutoring in other academic subjects may have been more helpful. Fifth, and most importantly, it is possible that the specific tutoring program we used would need to be modified to provide greater benefits to students who struggle with attention difficulties.

Because of all these issues, it is definitely not the case that parents and educators should stop pursuing efforts to provide extra academic help for students with ADHD. Doing so would represent a strong misreading of what can be concluded from this study.

What these results do clearly suggest, however, is that we cannot assume that academic interventions that are quite helpful for students with academic problems but good attention skills will prove equally helpful to students who also struggle with attention difficulties. Thus, the results underscore the pressing need to develop and research alternative interventions that may be more effective in promoting academic success for students with attention difficulties. In fact, an unfortunate truth in the current research literature is that there is currently no intervention for children with ADHD that has been conclusively demonstrated to promote long-term gains in academic achievement.

As a result of this study, I chose to pursue research on alternative interventions to boost academic achievement in students with attention difficulties. Currently, I am getting a study underway in which we will test whether computerized attention training and computerized instruction in basic academic skills will help inattentive first graders make better academic progress. The results from this study are at least 2-3 years away, and hopefully promising results from similar types of investigations will be published in the interim. If they are, I will be sure to include them in Attention Research Update.

In Honour of Stupid People Everywhere

In case you needed further proof that the human race is doomed through stupidity, here are some actual label instructions on consumer goods.

On a Sears hairdryer: *Do not use while sleeping.*
(Damn, and that's the only time I have to work on my hair).

On a bag of Fritos: **You could be a winner! No purchase necessary. Details inside.** ***(the shoplifter special)?***

On a bar of Dial soap: **"Directions: Use like regular soap."** ***(and that would be how??...)***

On some Swanson frozen dinners: **"Serving suggestion: Defrost."** ***(but, it's "just" a suggestion)..***

On Tesco's Tiramisu dessert (printed on bottom): **"Do not turn upside down."** ***(well...duh, a bit late, huh)!***

On Marks &Spencer Bread Pudding: **"Product will be hot after heating." (...and you thought????...)**

On packaging for a Rowenta iron: **"Do not iron clothes on body."**
(but wouldn't this save me more time)?

On Boot's Children Cough Medicine: **"Do not drive a car or operate machinery after taking this medication."**
(We could do a lot to reduce the rate of construction accidents if we could just get those 5-year-olds with head-colds off those forklifts.)

On Nytol Sleep Aid: **"Warning: May cause drowsiness."**
(and...I'm taking this because???....)

On most brands of Christmas lights: **"For indoor or outdoor use only."**

(as opposed to...what)?

On a Japanese food processor: **"Not to be used for the other use."**
(now, somebody out there, help me on this. I'm a bit curious.)

On Sainsbury's peanuts: **"Warning: contains nuts."**
(talk about a news flash)

On an American Airlines packet of nuts: **"Instructions: Open packet, eat nuts."**
(Step 3: maybe, uh...fly Delta?)

On a child's superman costume: **"Wearing of this garment does not enable you to fly."**
(I don't blame the company. I blame the parents for this one.)

On a Swedish chainsaw: **"Do not attempt to stop chain with your hands or genitals."**
(Oh my God ....was there a lot of this happening somewhere?)

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