About the Epilepsy Foundation

The Epilepsy Foundation is a national voluntary agency solely dedicated to the welfare of the nearly 3 million people with epilepsy in the U.S. and their families and caregivers. We work to ensure that people with seizures are able to participate in all life experiences; and to prevent, control and cure epilepsy through services, education, advocacy and research. In addition to programs conducted at the national level, people with epilepsy are also served by local Epilepsy Foundation affiliates across the country.

If you have any questions about epilepsy and seizure disorders, living with epilepsy, or helping a friend or family member who has epilepsy, please visit us at www.EpilepsyFoundation.org, or call 800-332-1000. Our website has comprehensive information about epilepsy and seizures and offers opportunities to connect with other people affected by epilepsy through our eCommunities forums and Web events. Our publication, epilepsyUSA, is a quarterly magazine that reports on developments for people affected by seizure disorders—new treatments and medicines, ground-breaking research, safety tips, personal stories, advice for parents and more.

This information is presented as a service of the Epilepsy Foundation. Medical knowledge changes rapidly and you should consult your medical practitioner for more recent or detailed information. This information is not medical advice. Do not change your medications as a result of this information without obtaining medical advice about your specific circumstance.
Are you a person with epilepsy or a person who cares about someone with epilepsy? If so, this booklet is for you. Getting the facts about the cognitive effects of epilepsy is important for living the best life possible.
What is Cognition?
Cognition is another word for awareness and understanding. Cognition is essential for learning and interacting appropriately.

Understanding Cognition and Epilepsy
Research is ongoing about the relationship between cognition and epilepsy.

Epilepsy is an interruption of electrical activity in the brain. Learning and awareness, or cognition, also takes place in the brain.

While research is ongoing on the relationship between cognition and epilepsy, there are some things we do know. This booklet aims to give you an overview of the current thinking.

Epilepsy Syndromes
An epilepsy syndrome is a group of signs or symptoms that typically occur together and are thought to be caused by an underlying brain abnormality. Some syndromes are a sign of an abnormality in a specific part of the brain and play a role in a very specific cognitive function, for example memory problems.

Other syndromes suggest more widespread brain abnormalities that are linked to more general and severe cognitive problems, for example developmental delay/mental retardation.
Age Effects
Earlier age of onset epilepsy is usually associated with more widespread and significant cognitive problems. This may be due to the effect of seizures on the developing brain, the increasing effects of seizures over time, or a combination of both.

There is little information about effects of seizures in older adults, but large numbers of generalized convulsions can result in cognitive decline.

Cognitive Effects of Antiepileptic Drugs (AEDs)
Many factors contribute to cognitive impairment in people with epilepsy including the cause of the seizures, length and frequency of seizures, and damage resulting from the seizures.

Yet, use of AEDs and their effects is important because it is something that can be changed. The cognitive functions most commonly affected by AEDs are attention, especially prolonged attention), psychomotor speed, memory, and dual processing tasks.

The risk of cognitive effects of AEDs are increased by:
- Higher doses and blood levels
- More than one medication
- Initial dose and increasing the dosage rapidly
- Age

Elderly people are more likely to experience cognitive effects of all drugs, including AEDs.

The risks of AED-induced cognitive side effects varies across AEDs.

AEDs with the least cognitive side effects are:
- gabapentin
- levetiracetam
- lamotrigine
- tiagabine

AEDs with intermediate degree of cognitive effects are:
- carbamazepine
- phenytoin
- oxcarbazepine
- valproate.

The AEDs with the worst cognitive side effects are:
- benzodiazepines
- phenobarbital
- topiramate.

People should discuss these risks and how to best balance them against other risks to achieve seizure control with their physician.

Cognitive Aspects of Epilepsy and Employment
People with epilepsy and cognitive impairments may experience challenges on the job from possible discrimination issues to learning, memory and attention problems that may affect performance and quality of work.
People with epilepsy are protected against employment discrimination by the Americans with Disabilities Act (ADA). For example, an employer may not discriminate against qualified individuals who are able to perform the essential functions of the job, with or without reasonable accommodation. In addition, an employer may not ask whether an applicant has a disability; or once employment begins, inquire about the disability and require medical examinations unless it is job-related and necessary. Refer to www.epilepsyfoundation.org for more about these legal rights.

People with well-controlled epilepsy and no other neurological problems may have close to expected employment rates. Yet, surveys suggest that at least one-third of people with epilepsy think that their epilepsy is a major reason for employment problems, underemployment, unemployment, and lack of advancement.

People with active seizures that affect consciousness have restricted job opportunities since they cannot drive, operate heavy equipment, or work at heights.

The key to working successfully with epilepsy and cognitive issues is educating your employer and co-workers about your seizure type and any reasonable accommodations that may be needed in order for you to perform well at your job.

Cognitive Aspects of Epilepsy and School

Children with epilepsy have a higher risk of learning problems, even though they might not have diagnosed learning disabilities. Some have a lot of problems while others only have mild learning problems.

Causes can include underlying brain dysfunction, frequent/poorly controlled or unrecognized seizures, medication side effects, and psychosocial issues (low-self esteem and the stress of trying not to appear different to their friends.)

When children with epilepsy have problems with school work and are not achieving at their grade level, parents can take steps including:

- making sure the child does not have a vision or hearing problem
- requesting a parent/teacher conference to pinpoint problem areas from the teacher’s point of view.

The next step is a meeting with the child’s neurologist to find out if his/her problems are due to medication side effects, unrecognized seizure activity, or an attention deficit disorder occurring along with the epilepsy.

Children with epilepsy may also require special education services such as: speech/language therapy, occupational therapy, physical therapy, a behavior plan.

The child may need special accommodations such as: special seating in class, extra time to complete work and tests, shortened assignments, oral/short answer/multiple choice testing.
A child may need the use of textbooks on tape, a computer with word processing or voice dictation capability. If a learning problem continues after the above steps are taken, a full evaluation with either a child psychologist or neurologist is suggested. At least one member of the evaluation team should have epilepsy expertise. There are laws requiring schools to measure a child’s eligibility for special education services and accommodations and consider private evaluations when planning for a student’s learning needs.

What is Attention Deficit Hyperactivity Disorder (ADHD)?

Attention deficit/hyperactivity disorder is a chronic condition that may result in school difficulties, social problems, and a higher risk of automobile accidents and substance abuse. ADHD is one of the most common behavioral disorders in childhood and may involve inattention, hyperactivity/impulsivity, or both. The symptoms of inattention may include trouble concentrating, frequent careless errors, not listening, failure to complete tasks, poor organization, procrastination, distractibility, forgetfulness, and losing things. Examples of hyperactivity (a higher than normal level of activity) are fidgeting, out-of-seat behavior, excessive running, noisy play, excessive talk and being constantly on the go. Impulsivity (acting on impulse or whim) may result in blunting out answers, interrupting, and trouble taking turns.

ADHD in Children with Epilepsy

Children with epilepsy are more likely to have attention deficit hyperactivity disorder (ADHD) than children without epilepsy. On average, about one-third of children with epilepsy have some difficulty with attention and frequent problems with hyperactivity and impulsivity. Boys and girls with epilepsy are equally likely to have problems with attention. This is different from the usual form of ADHD that is more common in boys. The symptoms of inattention often result in academic difficulties experienced by children with epilepsy.

Treatment of ADHD in children with epilepsy includes: better seizure control, medication, and behavioral management strategies in school (such as breaking tasks into smaller units and providing frequent feedback).

Resources for Learning Disabilities (LD) and Attention Deficit Hyperactivity Disorder (ADHD)

National Center for Learning Disabilities www.ncld.org
Learning Disability Association of America www.ldaamerica.org
International Dyslexia Association www.interdys.org
Council for Exceptional Children www.cec.org
CHADD (Children and Adults with ADD) www.chadd.org
American Academy of Child and Adolescent Psychiatry www.aacap.org
Epilepsy Foundations throughout the country have additional materials and offer a variety of programs to help people understand this common disorder.

For further information about epilepsy and the name of the Epilepsy Foundation nearest you, log on to www.epilepsyfoundation.org or call 800-332-1000.

This pamphlet contains general information for the public. It is not medical advice.

All decisions about ketogenic diet treatment, or any therapy for epilepsy should be made only after discussion with the treating physician.

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