

# PEDIATRIC NEUROLOGY BRIEFS

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### LEARNING DISABILITIES

#### LEARNING DISABILITIES AND FRONTAL LOBE DAMAGE

Two adult patients age 31 and 26 years who suffered bilateral prefrontal damage early in life and who subsequently presented with severe aberrant behavior, are reported from the Division of Behavioral Neurology and Neuroscience of the Harvard Neurology Department and Beth Israel Hospital, Boston, MA. One patient had a subdural hematoma and a collection over the left frontal lobe in the first week of life and the second patient suffered bilateral skull fractures and a right frontal hematoma in an automobile accident at four years of age. Neurological and neuropsychological examinations indicated the principle site of involvement was located bilaterally in the frontal lobes. Both patients had impulsive behavior triggered by stimulus, they performed with childish abandon and shallow foresight and neither was able to learn from negative experience or punishment. They were socially isolated, had little sense of remorse, empathy, or fairness towards others but instead felt victimized. Environmental factors did not account for their lifelong behavioral problems and prolonged psychotherapy and medications were without benefit. In comparison with severe deficits of comportsment, judgment and insight, neither patient displayed limiting deficits of language, memory, or visuospatial skills. The behavioral features were qualitatively similar but quantitatively more intense than behavioral deficits acquired in adulthood as a consequence of bilateral frontal lobe lesions. (Price BH et al. The comportsmental learning disabilities of early frontal lobe damage. Brain Oct 1990; 113:1383-1393).

COMMENT. A battery of developmental psychology tests showed that social and moral development of these two patients

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was arrested at an immature stage. The learning disability associated with bilateral prefrontal lesions acquired early in life is characterized by deficits in maturation of judgment, insight, foresight, abstract reasoning, perspective taking, empathy, and moral development. The predominantly behavioral presentation in the absence of focal neurological signs may lead to the erroneous impression that the underlying factors are primarily psychiatric or environmental. The EEGs of both patients were normal whereas the MRIs showed bilateral frontal lobe lesions. The WAIS-R was average in one patient and borderline to low average in the second patient.

Mesulan M-Marsel, an author of the above paper, writes in Neurologic Progress (Ann Neurol Nov 1990; 28:597-613) on "Large-scale neurocognitive networks and distributed processing for attention, language, and memory." The neurons of the CNS operate to receive sensory signals from outside and from within (input), they plan and execute motor acts (output), and govern intermediary processing between input and output. Thought, language, selective attention, memory, and advanced cognition and comportment are the products of intermediary processing networks located primarily in limbic and association areas. Complex behavior is mapped at the level of multifocal neural systems rather than specific anatomical sites and give rise to brain behavioral relationships that are both localized and distributed. Anatomical channels transfer information content and chemical pathways modulate behavior.

#### READING ABILITY AND BEHAVIOR IN ADOLESCENTS WITH EPILEPSY

Thirty-four adolescents with epilepsy, controls matched for age, sex, and general ability, were studied at the University Hospital, Cardiff, Wales. Adolescents with epilepsy had more difficult behavior in class, competitive sports were less popular and comprehension of reading material was significantly lower than that of control groups. The lowest reading scores were found in adolescents with myoclonic seizures, partial seizures with secondary generalization, or generalized tonic-clonic seizures. The low reading scores were also correlated with the EEG findings including 2 per second spike and wave, photosensitivity, generalized slow waves, or nonspecific generalized spike and wave. Problems in reading comprehension correlated with right focal slow wave, sharp waves, and spikes.

The effects of anticonvulsants on reading and behavior were also investigated. Higher reading scores were seen with ethosuximide and lower scores with benzodiazepines. The Rutter Behavior Scale was significantly higher in patients taking phenytoin indicating less good behavior in this subgroup. The lowest Rutter score occurred in the ethosuximide patients. (Clement MJ, Wallace SJ. A survey of adolescents with epilepsy. Dev Med Child Neurol Oct 1990; 32:849-857).