

alcohol use and the adolescent brain

Scientific research is revealing that the human brain continues to develop into the early 20s. The immature brain of the adolescent may help explain their tendency toward impulsivity and poor decision making. It also places your teen at an increased risk of alcohol and drug abuse. Most people begin to abuse drugs and alcohol during their teens. We are beginning to understand that the teenage brain's pleasure seeking or reward centers grow sooner than the regulatory portion of their brains. This means that adolescents are more vulnerable than adults to the effects and hazards of alcohol. A recent survey indicates that 36 percent of 19 to 28 year olds report having drunk five or more alcohol drinks in a row in the two weeks prior to taking the survey (Johnston, 2003).

Current research confirms that alcohol and drug use during the teen years is associated with negative long term effects on neurological functioning. Because young adulthood is a period full of social, occupational, and educational decisions, as well as brain development, the negative impacts of alcohol can be both short-term—in the form of poor or high-risk decisions, and long term—in the form of permanent cognitive impairment. During adolescence, the brain continues to grow and remodel high-level neuronal circuitry. That means the brain is actually growing and is forging new “hardwired” thought patterns that will last through adulthood. This period of extensive neuronal growth significantly impacts emotional regulation, self-control, and executive functioning. The brain continues to prune synapses, weeding out weak neurons. Increased myelination of the brain's neurons is occurring, allowing faster and more efficient conductivity of the brain's circuitry. When uninterrupted, either by trauma, chemical interference (e.g. alcohol abuse), or developmental issues, this process allows for improved impulse control, development of complex cognitive processes, improved working memory and operational thinking. (Hart 2007) It is important, therefore, to be protective of this period of critical brain development.

EFFECTS OF ADOLESCENT ALCOHOL USE ON NEUROLOGICAL PERFORMANCE (BROWN 2000)

- Decreased verbal and nonverbal memory
- Poorer visuospatial ability
- Decreased attention ability

EFFECTS OF ADOLESCENT ALCOHOL USE ON NEUROLOGICAL STRUCTURES

- Reduced hippocampal volume, which impacts learning and memory). (De Bellis 2000)
- Reduced white matter integrity in the corpus callosum, which coordinates movement, complex thought, communication, and coordination of the left and right brain hemispheres. (Tapert 2003)
- Decreased volume in the prefrontal lobe, which impacts complex cognitive planning, as well as behavior modulation and personality. (Bellis, 2005)

EFFECTS OF ADOLESCENT ALCOHOL USE AND BRAIN FUNCTIONING

- Decreased P300 brain waves which impedes information processing (Nichols and Martin 1993)
- Decreased blood flow in the frontal lobe which impedes executive functioning (Tapert 2004)

Frequent alcohol consumption correlates to a reinforcement of drinking behavior, thus increasing addictive tendencies in addition to behaviors linked to alcohol abuse, such as aggression and other acting-out behaviors (Tapert 2005).

What do we do as parents?

Early education is a key strategy for preventing abuse in adolescents. While parents cannot depend upon educators to inform their children about the risks of alcohol abuse, they can depend upon peer education. Peers frequently become the primary source of information on important topics that parents avoid or treat as taboo. It is critical, therefore, for parents to take an active role in communicating with their preteens and teens, informing them of alcohol's impact on mood, anxiety, brain development, increased risk taking, and the longterm consequences associated with alcohol use. In addition, it is important to emphasize the positive health impact of abstinence and to refute the flawed, wholesale acceptance in our society of heavy drinking as "normal" behavior. Effective education, however, requires a credible, mutually trusting relationship. With a teen son or daughter, the proverb "seek first to understand and then to be understood," is a wise first step in creating a platform for effective education.

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