Adolescence: Sensitive Period for Development of Addiction

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Storytelling and Stigma
Objective

Why is the adolescent period of human development a sensitive period for the development of substance use disorders?
Ryan

17yo M history of ADHD. Family is aware of some intermittent alcohol and cannabis use along with daily nicotine vape usage.

Brought for appointment secondary to making suicidal statements on social media and cutting himself.

Family report 6 month worsening of school refusal, anger, sleep problems, and hopelessness. They feel he may have depression and would like medication.
Ryan

Is this normal teen behavior?

What is causing these changes?

What role are the substances playing?

Is he depressed?
Ryan: **Adolescent Tasks**

- Explore and accept physical maturity
- Establish autonomous identity
- Gain independence from family unit
- Strongly connect with peers and community
- Explore alternative values and approaches to life

Ryan: Adolescent Behavior

- Difficulty with Emotional Regulation
- Pleasure seeking
- Impulsivity
- Novelty Bias
- Invincibility
Ryan: Adolescent Biology

- Gonadal steroid production
- White matter ↔ Gray matter volume
- Cortical and limbic reorganization
Ryan: Adolescent Brain Maturity

Primitive Structures
- Reward Pathway
- Emotional Response
- Energy Level

Advanced Structures
- Executive Function
- Memory Retrieval

Image courtesy of V.J. Wedeen and L.L. Wald, Martinos Center for Biomedical Imaging at MGH
Impact of Functional Mismatch


Source: https://www.istockphoto.com/photos/gas-pedal
A Predicable Equation

Dev Tasks $\rightarrow$ Behavior $\rightarrow$ Biology

$\equiv$ Risk Of Substance Use
Ryan: Gathering Information

“I smoke a half of a joint in the morning, a half before bed… I used a dab pen a couple of times…

I drink alcohol on the weekends with my friends. When we want to get messed up and have fun…

I vape whenever I can, sometimes I buy one and sometimes I use my friends.”

Source: www.councilonrecovery.org/adolescents-alcohol-abuse-growing-problem-talk-parents-can-stop/
Ryan: Gathering Information

“I am here to talk about depression and ADHD. Why does my use matter?”

Source: www.councilonrecovery.org/adolescents-alcohol-abuse-growing-problem-talk-parents-can-stop/
Brain Under Construction

Incomplete construction increases risk of developmental derailment
Domains of Impact

Biological  Psychological  Health Status  Social
Substance Use and Mental Health: Biological

Changes in Neurotransmitter Metabolism

Sleep Structure Changes

Structural Thickening in Anterior Prefrontal Cortex

Reward Pathway

Medication Interactions
Long Term Cognitive Impacts

- Executive Function Skills
- Intellectual Ability
- Memory storage and retrieval
- Alters Functioning of endogenous systems
  - reward pathway, pain, motivation, mood regulation
- Increases risk of ADHD-like symptoms

These symptoms may persist beyond acute use depending on substance choice, concentration, duration, age of cessation.

Cognitive Performance: Alcohol

16yo Non-Drinker 16yo Drinker

Same Performance

Non-Drinker at 21yo Drinker at 21yo

Significantly Impacted Performance

Tapert et al., 2001, 2004
Substance Use and Mental Health: Psychological

- Trauma Exposure
- Identity Development
- Trouble with Coping Skills
- Obscures Intrinsic Values
- Diagnostic Uncertainty – treatment confusion
Substance Withdrawal

- Irritability, anger, aggression
- Anxiety, nervousness
- Sleep difficulty
- Decreased appetite, weight loss
- Restlessness
- Depressed mood
- Abdominal pain, shakiness/tremor, sweating, fever, chills, headache... seizure, psychosis, death
Substance Use and Mental Health: Social

Family Conflict

Prosocial Isolation

Legal Involvement

Treatment Access Issues

Stigma
A Dangerous Equation?

Substance Exposure + Plastic Brain

Impacts to Development

Biological
Psychological
Social

Risk of Development of Lifelong SUD
Risk of Chronic Addiction

1 in 4 teens who use ANY SUBSTANCE IN ANY AMOUNT will struggle with chronic addiction in adulthood

This is 5 - 8x the population risk of SUD
Early Age of first use increases risk of addiction to any substance later in life.

47% at 13yo  
9% at 21yo

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Cannabis Use and Addiction

Spread the word: Delay Use
17% at 13yo
4% at 21yo

Cruel Trick?

Opportunity?
Discussion and Questions

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References


**Adolescents Differ from Adults in Substances Most Abused** Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2013.

SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2013.

National Institute on Drug Abuse; National Institutes of Health; U.S. Department of Health and Human Services.


Other citations on slides
References


Other citations on slides