NCIC Education Conference

SUBSTANCE USE DISORDERS AND RECOVERY

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Initiating and Sustaining Recovery

- Problem severity

Mild

Moderate

Severe
Initiating and Sustaining Recovery

- **Problem complexity**
  - Addiction
  - Addiction + Mental Illness
  - Addiction + Mental Illness – Housing – Social Supports

- **Recovery capital**
  - Internal and external resources that can be mobilized

- **Access to appropriately designed services**
Many Paths Into Recovery

- Solo (natural) recovery
- Peer Assisted
  - Mutual Support groups (i.e. Alcoholics Anonymous)
- Treatment Assisted
Emerging Evidence on Addiction

- Addiction is a brain disease
  - The mesolimbic dopamine system (reward pathway)

- Vulnerability for addiction
  - Why do some people develop problems with alcohol and other drugs while other people don’t?

- Long-term effects of addiction
  - How does this impact the recovery process

- Addiction as a chronic illness
Mesolimbic Dopamine System
Mesolimbic Dopamine System

- This system is a collection of neurons that release the neurotransmitter dopamine.
  - Often called the reward pathway
- This pathway is activated by things that are rewarding.
Mesolimbic Dopamine System
Mesolimbic Dopamine System

• What behaviors are related to survival?
  ○ Food, water, sex and nurturing
  ○ They are rewarding and are considered “natural reinforcers” because they are directly related to our survival

• What assures that we will engage in these behaviors?
  ○ The release of dopamine
Mesolimbic Dopamine System

- Rewarding experiences tell the brain “do it again” so a behavior will be repeated
  - AOD increase dopamine at a much greater magnitude and duration than natural reinforcers (5–10 times greater)
Understanding the Power of Dopamine

**Food**

Di Chiara et al.

- Scale 0 – 200

**Amphetamine**

- Scale 0 – 1,100
Mesolimbic Dopamine System

- The probability of dopamine interacting with a receptor is based upon how much dopamine is released and how many receptors are available.
Vulnerability for Addiction

- Genes and environment contribute to increased risk for AOD problems or can serve as protective factors against AOD problems
Developmental Vulnerabilities

- The mean age of initiation of drinking alcohol in 2005 was 14.2 years

- What is happening in the adolescent brain when this occurs?
Age 12
During adolescence, the brain is undergoing a lot of changes. Gray matter diminishes as neural connections are pruned.

Age 16
Because the brain is still developing, it is more sensitive to drugs.

Age 20
The changes drugs cause are more likely to 'stick' and become hardwired as addiction by adulthood.
Developmental Vulnerabilities

- Individuals who are not heavy users of alcohol or other drugs during adolescence and into their early 20s are less likely to develop an addiction in later life
Biological Vulnerabilities

- Differences between how individuals experience the effects of alcohol and other drugs
Group One
Usual or normal response

Group Two
- Feelings of intoxication
- Stimulation
- Sedation
- Happiness

Alcohol

3 times more likely to have a family history of alcoholism than members of Group One
Dopamine Receptors

- In one study, Ritalin was administered intravenously to test subjects.
50% of the subjects experienced negative effects of the stimulant.

50% of the subjects experienced positive effects of the stimulant.

- Heart rate
- Sweating
- Anxiety
- Paranoia
- Energy
- Confidence
- Euphoria

Those who experienced the pleasurable effects had fewer D₂ receptors.
Mesolimbic Dopamine System

Personal Vulnerabilities

Neurobiological Consequences
Neurobiological Consequences

- Prolonged AOD use in vulnerable individuals changes brain functioning:
  - Related to memory
  - Related to judgment/decision making
  - Related to the ability to find natural rewards “rewarding”
  - Related to delaying gratification
The Role of Memory

- Memory plays a significant role in:
  - Continued use
  - Attempts to achieve and sustain abstinence
The Role of Memory in Addiction

- The brain records the pleasurable experience through connections to memory and emotion in the amygdala and hippocampus (euphoric recall)
  - As a result, dopamine activity increases, not only during a rewarding or pleasurable experience, but also in anticipation of one
The Memory of Drugs

Front of Brain

Amygdala not lit up

Back of Brain

Nature Video

Cocaine Video

Amygdala activated
• Slides were presented randomly for 33 msec followed by 467 msec neutral slides

• 33 msec escapes conscious detection

• Despite no conscious recognition, the limbic system showed activation in response to the slides.
Judgement/Decision Making
Judgement/Decision Making
Judgement/Decision Making
Recovery of Brain Functioning with Prolonged Abstinence

Normal Brain

Brain of Meth User 1 month abstinent

Brain of Meth User 14 months abstinent
Effect of Cocaine Abuse on Dopamine D2 Receptors

normal subject

cocaine abuser (1 month post)

cocaine abuser (4 months post)
Dopamine D2 Receptor Availability

Comparison Subject

Addicted Person

Cocaine

Methamphetamine

Alcohol
Mesolimbic Dopamine System

Personal Vulnerabilities

Neurobiological Consequences

Addiction as a Chronic Illness
Addiction as a Chronic Illness

- Historically, treatment of severe and persistent AOD problems has resembled interventions for acute health conditions (e.g., traumatic injuries, bacterial infections)
Implications

- For persons with hypertension & diabetes
  - A recurrence of symptoms (relapse) following treatment cessation is considered evidence of treatment effectiveness
  - This is used to justify devoting resources to continuing treatment

- For persons with alcoholism and addiction
  - A recurrence of symptoms (relapse) following treatment cessation is considered evidence of treatment failure
  - This is used to justify not investing further resources into treatment
  - Treatment needs to shift from an acute care model to recovery oriented systems of care
Implications
Video Recap

- American Chemical Society: The Science of Addiction
Healing Transitions (formerly The Healing Place of Wake County) is a 501(c)(3) homeless shelter that offers:

- Overnight emergency shelter
- Non-medical detoxification; and
- A long-term, 12-step based, peer run recovery program for persons with alcoholism and other drug addictions
Guiding Principles of Healing Transitions

- Low threshold for engagement
- Services on demand
- Attraction is critical
- As many times as it takes
- Hand up, not hand out program
  - You do a little, we do a little. You do a lot, we do a lot
References

- Clear, J., 40 Years of Stanford Research Found That People With This One Quality Are More Likely to Succeed. http://jamesclear.com/delayed-gratification
References

References


