Pathways to Alcohol-Induced Brain Impairment in Young People

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Our central question

‘Are young alcohol misusers on the same pathway as those who develop alcohol-related brain damage’?

Now a scientific debate?

Alcohol & Young People

- binge drinkers
- 1 in 4 at risk of alcohol-related harm (at least monthly)
- drink less often than older adults but more drinks per occasion
- drinking to intoxication is common

The teenage brain is:

- more sensitive to injury;
- less responsive to cues to stop drinking;
- better able to cope with hangover;
- more vulnerable to cognitive effects of alcohol;
- less sleepy at night (longer drinking occasion);
- more susceptible to dependence / addiction.
The earlier the age of drinking onset, the more likely an individual will experience long-term problems associated with alcohol...

2007 National Survey

Age of first drink

Alcohol & the Brain

- Difficulty walking, blurred vision, slurred speech, slowed reaction times, impaired memory...
- clearly, alcohol affects the brain.
- Some impairments detectable after 1 or 2 drinks...
- Heavy drinkers may have brain deficits that persist

When alcohol affects the:

- FRONTAL LOBES - a person may find it hard to control his or her emotions & urges.
- Drinking alcohol over a long period of time can damage the frontal lobes forever...

Alcohol damages the brain
When alcohol affects the:

- **HIPPOCAMPUS** - a person may have trouble remembering something he or she just learned...
- Fast, excessive drinking leads to **BLACKOUT**

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**Our literature review**

- Specific drinking patterns in YP
- Brain maturation until 25 years; a ‘window of vulnerability'
- Young drinkers show impairments in executive functions & memory (frontal & temporal brain structures)

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**Our literature review**

- Pre-existing neurobiological changes?
- Younger misusers vulnerable to ongoing damage;
  - animal studies highlight this vulnerability, exposed by binge drinking

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**Animal studies**

- Binge drinking girls/boys show visual spatial/sustained attention deficits
- Detox teenagers have poorer memory of verbal & nonverbal information
- Teen bingers - widespread reductions in WM integrity
- Adolescent AUD - decreased hippocampal volumes
Depressed binge drinkers

Can one recover?

“unknown whether the cognitive downward slides in teenage binge drinkers is reversible”
- Susan Tapert

With abstinence some functions (attention, memory) can recover, however, other (usually executive) deficits remain...

Future directions

- Guidelines on detecting early AIBI
- Increased awareness about alcohol’s effects on cognition (thinking, learning, decision making)
- Neurobiological biomarkers
- Cognitive remediation
- Longitudinal research needed

Questions?

Comments?

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Key statistics

Drinking guidelines

NHMRC recommend the following:
- No more than 2 standard drinks / day - to reduce lifetime risk of harm from alcohol-related diseases or injury
- No more than 4 standard drinks on a single occasion - to reduce risk of an immediate alcohol-related injury
- Under 15 years are at greatest risk of harm from drinking
- 15-17 years should delay their first drink for as long as possible
- Drinks should not be consumed quickly
- Under 15 yrs and pregnant women should avoid alcohol
Alcohol Use Disorders (AUD)

- **Alcohol abuse**: recurrent use that leads to (any one of):
  - Failure to fulfill role (schools, work, home)
  - Risky behaviour
  - Legal problems
  - Drink despite problems

- **Alcohol dependence**: use that leads to (3 or more of):
  - Tolerance (same amount doesn't effect you as much)
  - Withdrawal (physiological reactions – not 'hangover')
  - Increase in drinking time/amount
  - Wanting to cut down / stop – but cannot
  - Getting intoxicated becomes time consuming
  - Drinking replaces social / academic activities
  - Drinking despite knowing problems (physical / psychological)

What does alcohol do?

- Not necessarily make you feel depressed, but it can exaggerate mood
- If you have a mental health issue like depression, alcohol can make these feelings stronger.
- Drinking too much can cause lots of short-term problems: headaches, feeling sick / vomiting, feeling dizzy, dehydration, passing out, 'hung over'.
- Being drunk can lead to aggressiveness & being in risky situations.

Dextox study: Case study

- *Excessive Alcohol Use When You’re Young Could Have Lasting Impacts on Your Brain*