Brain injury and co-occurring conditions: Characteristics and interventions

Robert Walker, M.S.W., L.C.S.W.
Assistant Professor, University of Kentucky Center on Drug and Alcohol Research
Staring point

- Every mental disorder, including substance abuse involves brain dysfunction.
- While it has been critical for each mental disorder and brain injury to carve out information about the uniqueness of specific conditions, this overlooks some common issues.
- More critically, many of these conditions co-exist.
- Even more troubling, there can be synergy among the disorders and conditions.
First, some basics

- Most of the mental disorders treated in community practice involve abnormalities in neurochemistry and neuroanatomy resulting in what are now termed “neurobehavioral problems.”

- Virtually every serious disorder carries with it structural variance from the “normal” development of the brain.
  - These structural and neurochemical differences can occur in many regions of the brain.

- Most disorders also involve dysfunction of the frontal lobes.

- The concept of co-occurring disorder is useful in understanding all forms of brain-related disorders due to the great likelihood that the neuroanatomical and neurochemical disturbances will result in multiple behavioral outcomes.
The co-occurring view bypasses cause/effect interpretations.

The co-occurring conditions with brain injury
Likely Co-occurring Conditions

- Substance use disorders – abuse and dependence
- Depression – apathy, fatigue
- Chronic nonmalignant pain
- Anxiety disorders including PTSD
- Personality disorders
- Sleep disorder
- Aggression
Alcohol abuse
Depression
ABI
Chronic pain
Nicotine dependence

ADHD
PTSD
ABI
Sleep disorder
Caffeine abuse

Personality disorder
Depression
Anxiety disorder
Chronic pain
ABI
Obesity
Substance use disorders

- The pre-injury relationship of TBI to substance abuse is very robust – 70%
- Presence of alcohol during brain injury is associated with poorer outcome
- Post injury increased substance use is typical
- Effects of substance use are likely to be more pronounced among those with brain injury
- Substance use post injury increases the risk of another BI
- With evidence of genetic contribution to alcohol addiction, there are also likely frontal lobe dysfunctions associated as well
Substance use and the brain

- Concern centers around how psychoactive substances affect key pleasure and reward centers of the brain.
- And, they result in decreased activation of the frontal lobes.
- Long term use is associated with anatomical and neurochemical changes to the brain.
- Habituation affects neurotransmitter receptor sites.
Risks for substance abuse

▲ There are multiple risk factors for substance abuse or dependence

▲ Depression

▲ Anxiety

▲ Chronic non-malignant pain

▲ Familial history of substance abuse (apart from genetics)
Dopamine Pathways

Functions:
- reward/salience
- pleasure, euphoria
- motor function (fine tuning)
- compulsion
- perseveration

Frontal cortex
Striatum
Substantia nigra
Nucleus accumbens
VTA
Hippocampus
This slide shows the specific regions in the brain where opiate receptors are particularly prevalent.
Brain areas affected by substances

- While the limbic and midbrain structures (NAc & Ventral Tegmental Area (VTA)) are involved as part of the reward process, other areas are negatively affected.

- There is deactivation of frontal lobes with damage to orbital-frontal areas as well as dorsolateral areas.

- The result is blunting of emotion processing, empathy, sympathy – the higher social emotions – emotional reasoning – and diminished impulse inhibition.

- The combination of damage from excessive substance abuse and brain injury is complex and can be very severe.
The Lobes of the Human Brain

- Frontal cortex
- Dorsal-lateral prefrontal
- Ventral-lateral prefrontal
- Motor cortex
- Somatosensory cortex
- Central sulcus
- Orbital frontal cortex
Drug user’s brain from the under side

Drug user’s brain from the top
Healthy brain from the underside

AMEN CLINIC BRAIN
SPECT GALLERY
Healthy brain from the top

AMEN CLINIC BRAIN
SPECT GALLERY
Treatment considerations

- Substance abuse treatment or recovery?
- Recovery is a closer fit for those with ABI
- Kentucky is developing 10 residential facilities statewide – 100 beds each – 5 for males, 5 for females
- Acute treatment is largely useless for this population with ABI
- Be sure to locate treatment/recovery provider with an eye on co-occurring disorders
Other treatment considerations

✦ Admitting ABI clients to traditional treatment programs poses a problem – all are rule and phase scripted

✦ Individuals with ABI have great difficulty accommodating rigid program rules

✦ Case management, day programs, and frequent therapeutic contact plus self-help are all critical

✦ There is evidence of brain recovery parallel to addition recovery
Imaging the underside: Extensive HX Alcohol and Cocaine - Before and After TX

Before

After

Depression

- Prevalence rates among ABI individuals are all over the place (6% to 77%) – in general population @8%, lifetime = @15% - 20%

- Stable estimates of at least 25% among ABI within the first year

- It is difficult to separate post injury depression that is secondary to awareness of losses of functioning versus depression that is a function of the physical injury (blunted thinking, fatigue, etc)

- Also, it is hard to separate economic losses and consequent depression related to that

- Depression increasingly shown to be a risk factor to recovery from many health conditions and certainly substance abuse recovery
Depression

- Long term depression alters gene expression, affecting neurotransmitter production - serotonin
- Long term depression is associated with frontal lobe impairment
- It is also associated with cell volume loss in the hippocampus and amygdala
- About 50% of those with depression also have some anxiety disorder
- Depression and apathy among those with ABI – difficult to parse apart – they are synergistic
Underside view of a depressed brain – see the yellow and green areas at the frontal lobe area showing decreased activity there.

Picture courtesy of Dr. William Klindt of Silicon Valley Brain SPECT Imaging, San Jose, California www.braininspect.com
Another view showing lower neural activity in the frontal lobes in a depressed individual
Depression

- Popular focus on “clinical depression” has confused about this condition

- The depression that individuals with ABI have is likely atypical and does not conform well to DSM-IV-TR criteria

- Has more in common with adolescent depression – irritability may be manifested

- Fatigue a common feature as with DSM criteria

- Apathy may accompany depressed mood or be an independent characteristic
Treatment for mood disorders

- ABI greatly complicates treatment of depression
- There is a serious lack of clinical trials with placebo
- Medication should be pursued carefully
- Case managers and non-medical providers may need to be watchful of medical interventions
- Some SSRIs may be helpful and trazodone, nefazodone may also be useful
- Psychotherapy may be useful depending on cognitive capacities
Chronic non-malignant pain

- Pain is subjective, influenced by genes, culture, personality, psychological make-up, and environment
- Many substance abusers have increased pain sensitivity and poorer pain management ability
- Post injury pain includes headaches – often severe – up to 90% of injured experience these
- Pain sensitivity is increased among those with depression
Chronic pain

- Depression increases the risk for having chronic pain
- Chronic pain does not arise directly from the brain injury
- Damage to area immediately behind frontal cortex (anterior cingulate cortex) is involved with pain mediation and relation of pain to emotion
- Frontal lobes have a role in moderating pain experience and concentrating focus away from pain
Anatomy and pain: One dimension

Pain is mediated in large part by ACC and its projections from the thalamus.

The ACC can be damaged in frontal lobe insults, thus affecting pain mediation and moderation.
Treatment of chronic pain

⚠️ Extreme caution about the use of opioids, and corticosteroids

⚠️ Tricyclic antidepressants may be considered though the side effect profile can be harmful to rehabilitation

⚠️ The medications used for neurogenic or neuropathic pain – gabapentin and carbamazepine have deleterious effects on brain recovery
Treatment of chronic pain

- Education can be helpful
- Relaxation training
- Cognitive-behavioral approaches – avoiding misleading thoughts about pain
- Habit reversal training – teaching avoidance of activities or postures that contribute to pain.
Sleep disorders

- Multiple waking episodes
- Sleep disorder is linked to mood and emotion regulation
- The amygdala goes into overdrive when sleep deprived – bypasses frontal lobes – goes directly to locus coeruleus
- Damaged REM sleep – associated with loss of restfulness
  - Also associated with negative effects on memory formation
  - REM is also negatively affected by alcohol use
- The relationship between ABI and sleep disorder is not well known
- Sleep disorder may be mediated through the other mental disorders following ABI
Sleep disorder

- However, more recent research has shown that sleep disorder may be an independent disorder that results in greater risk for mental disorder. That is, sleep disorder is NOT just a symptom of other disorder.

- It is common among those with alcohol abuse.

- Has been traditionally seen as symptom of depression and anxiety disorders – PTSD.

- Sleep disorder can take many forms – hypersomnia, insomnia, sleep-wake cycle dysregulation, etc.

- Frontal lobes are particularly sensitive to sleep deprivation – however temporal - parietal lobes show over activation and may be compensating.
**Frontal lobe**
- voluntary control of skeletal muscle
- personality
- higher intellectual processes
  (concentration, planning, and decision making)

**Temporal lobe**
interpretation of auditory sensations
storing (memory) auditory and visual experiences

**Occipital lobe**
integrates movement in focusing eye conscious perception of vision

**Parietal lobe**
cutaneous and muscular sensations
understanding speech
Treatment of sleep disorders

- Regulating sleep cycle is the first step and should be done in great detail.

- This includes walking a person through an entire daily cycle from waking up to next waking up period.

- Pay attention to details – reasons for waking up in the middle of the night.

- What time does the person go to sleep?

- What is eaten or drunk in the evening?

- Naps in the middle of the day?

- Sleeping in late?
Sleep

- Working toward a routine sleep cycle is critical
- Set up environmental controls if possible
- Keep sleep diary and bring it to sessions
- May use OTC sleep aids (benadryl)
- Other medication such as temazepam or zolpidem might be used if there are reliable controls over mediation use
  - If USED – monitor carefully for other unexpected cognitive effects
Anxiety disorders & PTSD

- As with other disorders, special caution must be taken with any medical intervention
- The specific relationship of anxiety to ABI is unclear – is it the injury or the live events afterwards?
- It used to be thought that PTSD and TBI were mutually exclusive clinical outcomes – longer LOC may be related to not having PTSD
- With OIF & OEF, evidence of co-occurrence – upwards of 11% with both conditions
Anxiety

- Damage to frontal lobes may contribute due to loss of ability to dampen down arousal triggered via amygdala and locus coeruleus

- Overactivation of the HPA Axis – reduced activation of frontal lobes in dampening arousal states

- TBI and PTSD both are associated with reduced cell volume in the amygdala and hippocampus

- Decreased activation of the ACC which mediates emotion and pain
Treatment of anxiety

- Buspirone may be considered – has not the motor effects of other anxiolytics
  - Also reduces agitation and panic
- SSRIs – no controlled trials yet with anxiety among ABI individuals
- Anticonvulsants (gabapentin etc) have possible use but also serious negative side effects
- Cognitive-behavioral therapy may be useful – more than the typical 6-8 sessions
- Education about anxiety (using brain info) may be useful
Personality disorder

- Exaggeration of personality traits is very common following TBI
- Disinhibition is a common trait
- Loss of sense of self – who I was
- Others may feel this even more intensely
- Judgment problems
- Social context/social intelligence can be damaged
Treatment of personality traits

- Coaching, the use of frequent and persistent reminders about targeted behaviors (positive or negative)
- Counseling (if there is sufficient cognitive capacity for this)
- Establishing graduated social encounters – environmental approach
- Developing cues for use by family members with the ABI individual
So, where do we go from here?

Some things to think about doing and some things to quit doing
Do not hold out hope for a wonderful, successful residential program that “really works.”

- While there are residential programs that have some relatively immediate positive results, be cautious about this.
- The chronicity of ABI and co-occurring disorders problems suggest that we need more focus on long-term management of problems, not “treatment” as we usually think of it.

The number of persons with ABI and substance abuse or other co-occurring disorder vastly exceeds the number of beds available.

The very nature of most ABI problems suggests that the likelihood of positive outcomes from traditional treatment is unlikely.
Why not traditional treatment?

- Because most traditional SA programs use cognitive-behavioral approaches that assume a basically intact cognitive capability.

- Because traditional substance abuse treatment still places a high premium on the will to change –
  - Called “stages of change” or
  - “Treatment readiness” or
  - “Treatment motivation”

- Other treatments are postulated on an otherwise generally healthy brain
So, what’s needed?

- Services that take into account the co-occurring chronicity of both ABI and substance abuse or other co-occurring condition

- Providers who think in terms of long term care and booster sessions to solidify gains from more acute treatments

- Careful monitoring over time to examine how changes are sustained by client environment.
Service array for persons with ABI and co-occurring disorders

- Careful, ongoing assessment of functioning and needs
- Linkage to a targeted case management service.
- Linkage to clinical consultants
- Intensive Outpatient or other day programs are greatly preferred over standard outpatient counseling for any number of ABI plus co-occurring disorders
- Residential may be helpful, but long term facilities are hard to find and always leave questions about how much of the program “stays” with the client
- Providers who use specific skill building treatments or rehab rather than attempting global enhancement of overall cognitive functioning.
The overall picture

⚠️ Overall, you will need a clear understanding of the neurobehavioral patterns of your client

⚠️ This means:
  - Cognitive processing factors
  - Emotion processing factors
  - Behavioral factors

⚠️ Coupled with the environmental contribution to current levels of functioning
Ongoing assessment of functioning re- substance abuse

- This involves close assessment of substance use patterns -
  - What substances are used – and in what combinations?
  - What frequency?
  - How are the substances obtained?
  - What volume or dose?
  - Where is it used – with others?
  - What are the effects of the substance on behavior both during intoxication and longer term?
  - TBI number, severity and substance use associations
Ongoing assessment of daily functioning

- Assess daily living habits
  - Sleep/wake cycle
  - Body care, clothing
  - Risk taking behaviors/habit
  - Diet habits
  - Social interaction – particularly in terms of exposure to substance use
  - Aggression
  - Applied concentration/application to tasks

- Willa Presmanes ADL scale may be helpful
Ongoing assessment of functioning

⚠️ What was the client’s level of pre-injury functioning?

⚠️ Changes in assessed level of functioning post rehab – i.e., what is the “start point” for expectations of other interventions?

- If the pre-injury functioning was low, with heavy substance use or severe other symptoms, then more environmental approaches are going to be critical.

- The best scenario for interventions is with higher pre-injury functioning
Ongoing assessment of needs

- This is largely a case management activity.
- Should be done in concert with clinical provider, if possible.
- Should include caregiver.
- Caregiver’s substance use may need to be assessed as part of the intervention planning.
Ongoing assessment of needs

- Needs for respite care?
  - What kind of respite can be matched to this client?

- Need for self-help?
  - Try to recruit AA sponsor sympathetic to ABI or even one with ABI.
  - Look for 2 years+ recovery
  - Get references
  - Contact PAR (Persons Advocating Recovery) for potential candidates
  - Contact NAMI for other self help programs
Beginning points:
Getting your bearings
Some helpful hints – regardless of approach

Focus on one or two issues per session – Don’t make it too complicated.

Do counseling where there is limited background noise or other people talking.

Ask simple, short questions.

Use open-ended questions - NOT questions that can be answered with “yes” or “no” responses.

Keep the sessions short – if necessary, consider more sessions, but for shorter amounts of time (2 half sessions per week instead of 1 hour-long session).
Focusing on one or two issues per session

► Use scenarios or brief stories to illustrate points and to reinforce the central issue of the session.

► At the beginning of the session state the issue for the session.

   □ Then work on it
   □ and end the session with a repeat of the issue followed by –

► Having the person restate the issue and his/her plan for putting suggestions into practice.
Provide counseling in a quiet place

- Background noise or other voices can be very distracting to some clients with brain injuries, who may be unable to screen out distractions.

- The person’s hearing may function like a crystal microphone, picking up everything as if it were foreground information to be processed and attended to.

- Counseling in group settings may be difficult if the practice of one person speaking at a time is not reinforced.
Use open-ended questions

- Open-ended questions take more thinking to ask, AND more thought to respond –

- Therefore, they also challenge the brain and frontal lobes a bit more and that is a good exercise for injured brains.

- Look at the difference:
  - Close-ended: “Have you been doing more work on your anger this week?”
  - Open-ended: “How did you deal with anger this week?”
Use open-ended questions

- When you ask open-ended questions, it causes people to think.

- And the act of thinking is rehabilitating.

- Exercising “thinking muscles” in the frontal cortex is much like exercising arm or leg muscles – the more they are used, the stronger they become.

- Close-ended questions demand nothing of the brain and therefore they do nothing to stimulate growth and development.
Use brief sessions

- Having to focus can be very tiring to people with TBI.

- They may be unable to focus for much more than 30-40 minutes.

- Once concentration is broken, progress comes to a halt, and further efforts may be counterproductive.

- More sessions with shorter times is a better plan.

- 20-30 minute sessions may be ideal – OR give multiple breaks if sessions must be longer.

- If the client is in a day program - use frequent breaks.
Sample intervention aids: Some considerations

- Memory aids - personal posters
- Recovery books
- Flash cards - visual cues
Sample intervention aids

- **Individually tailored memory aids** can help prompt the person to remember key relapse prevention plans.

- **Temporary tattoos** may be useful, for example.

- **Personal Posters** – can list schedule for meds, appointments – post it on back of bedroom door – do a different one each month, etc

- **Recovery books or memory books** with key contacts and important guidelines for behavior in bulleted format.

- **Flash cards and other visual cues and signals** for group and individual work
Other devices/techniques

- Make use of telephone case management contacts – reminders to clients about appointment, going to day programs, “just checking in.”

- Give clients calendars with key events marked in bold letters – circled days, etc.

- Put your contact info in plastic cover so it can endure abuse – makes it harder to lose.

- Try to schedule services and events on a routine – for example, if you plan to see the client 3x per week – make it the same MWF or MWTTh – keep it routine.
Other Minders

- Minders may also include smaller cards that can be posted in the bathroom, in the kitchen, and in the car or other places.
- Use with magnets
- The cards can include individualized cautions or instructions such as the samples on the next couple of slides.
Recovery Books

- Buy an inexpensive chapbook and you and the client make entries in during sessions.

- Use tabs for key sections with “dos and don’ts” – a quick reference.

- If you have access to wrap-around funds, purchase $5.00 or $10.00 gift cards to use as incentives for doing work in the book.
Examples of Flash Cards

If you are doing a group or individual sessions, flash cards that target key decisional factors or that make a point can be useful.

The cards should be big enough to be a “sign” but small enough to keep beside the clinician’s chair.

Even other clients can be keepers of the cards and flash them when the moment is right.
What’s the fall-back plan?

Tell me - What’s YOUR SAFETY NET?
Remember - THINK first
STOP, LISTEN to others, then THINK about it!

Then – take action
On relapse prevention ……

What are your triggers?
- Name them
Analog Scales

Some assessment tools can actually be employed during treatment to help people identify their feelings and thoughts.

For example, flash cards with visual analog scales work very well and bring discussion down to concrete terms very quickly.

Visual analogs can facilitate problem recognition and definition.

- This can include the use of visual analog scales for measuring problems and for “scoring” recovery-oriented responses to treatment. (I.e., holding up score cards for responses).
Visual Analog Scale - Anger

How **Angry** I am right now......

Not at all

angry

Ready to explode

1 2 3 4 5 6 7 8 9 10
Visual Analog Scale - Depression

How **DOWN** I am right now......

Not at all
Depressed

Really
Depressed

1 2 3 4 5 6 7 8 9 10
Visual Analog Scale - Anxious - Nervous

How **Nervous** I am right now......

Not at all

Really

Nervous

1 2 3 4 5 6 7 8 9 10
Visual Analog Scale - Relapse

How close I am right now to relapse......

Not at all    close    Really close

1  2  3  4  5  6  7  8  9  10
Other Approaches

- Abstinence or recovery coaching – a new treatment role for clinicians

- Peer mentors have been very successful at this

- It does not use standard “counseling” approaches – there is little exploration with this approach.

- It is a matter of teaching, correcting, monitoring, providing feedback, and showing how.
Coaching

- This involves informing the client that you are his/her “recovery coach.” – Make it a job and task descriptor.
- This re-defines the statement “What are we going to work on today?”
- Here are example statements from a coaching role:
  - Let’s practice how to talk with your mother
  - Let’s go over how you look for work
  - Let’s try a couple of ways to handle teasing
  - What happened in your last AA meeting? Let’s go over it.
Select bibliography


