Interdisciplinary Rehabilitation of Executive Dysfunction

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The Importance of Depression in Magnification of Executive Dysfunction

- Identifying and treating depression must be taken on as an interdisciplinary challenge.

Remediating Executive Function Deficits

- Defining the “just-right challenge” for adults with work disability.
DEFINITIONS

- Executive function is the ability to integrate various component cognitive abilities to produce meaningful task performance.

- Executive dysfunction is the relative inability to devise novel responses, suppress habitual responses, identify and correct errors, and plan, organize, and initiate new solutions to challenging tasks.
EF AND DEPRESSION

- Depression as an interdisciplinary challenge.
  - Definition
    - Operational / DSM-IV Diagnosis
    - Neurochemical
  - Magnification of EF and other cognitive deficits.
  - Screening vs. Diagnosis
DEPRESSION - DSM-IV

Five or more of the following, at least one of which is depressed mood or loss of interest:

- Depressed mood;
- Markedly diminished interest or pleasure in activities;
- Significant weight loss;
- Insomnia or hypersomnia;
- Psychomotor agitation or retardation;
- Fatigue or loss of energy;
- Feelings of worthlessness or excessive guilt;
- Diminished ability to think or concentrate, or indecisiveness;
- Recurrent thoughts of death.
Depression and TBI

- Major Depressive Disorder
  - “The 1-year cumulative rate of MDD in this study sample is 7.9-times greater than would be expected in the general population (53.1% in our cohort vs. 6.7% in the general population).”
Figure 2. Rate and Cumulative Rate of Major Depression Depending on Time Since Traumatic Brain Injury (N = 559)

Bombardier, C. H. et al. JAMA 2010;303:1938-1945
Depression reflects neurochemical changes that also impair executive functions:

- Cognitive Flexibility
- Emotional Control
- Initiation
- Working Memory
- Plan / Organize
- Task Monitoring
- Organization of Materials
NEUROTRANSMITTER STORM AFTER TBI

Immediately on concussion, disruption of the neuron membranes and stretching of the axons increases potassium outside the neurons and causes depolarization and release of these neurotransmitters:

- Dopamine
- Norepinephrine
- Serotonin
- Acetylcholine
- Glutamate
NEUROTRANSMITTER DEFICITS

Norepinephrine
Alertness
Energy

Dopamine
Attention
Motivation
Pleasure
Reward

Serotonin
Dysresolution >
Obsessions
Compulsions

DEPRESSION

- Depression *creates* neurochemical changes that also impair executive functions.
  - Impulse Inhibition
  - Cognitive Flexibility
  - Emotional Control
  - Self-Awareness
  - Initiation
  - Working Memory
  - Plan / Organize
  - Task Monitoring
  - Organization of Materials
NEUROTRANSMITTER DEFICITS

Depression Intervention

- Depression screening:
  - Beck Depression Inventory
    - 21 sections of 4 responses each
    - 5 sections relevant to EF
    - Gold standard for screening
    - “Likelihood of …”
  - Stanford Mood Scale
    - 15 Yes – No statements
    - Focused on mood; only 2 sections relevant to EF
    - Public domain
BECK EXECUTIVE FUNCTION ITEMS

11. Agitation
   0  I am no more restless or wound up than usual.
   1  I feel more restless or wound up than usual.
   2  I am so restless or agitated that it’s hard to stay still.
   3  I am so restless or agitated that I have to keep moving or doing something.

13. Indecisiveness
   0  I make decisions about as well as ever.
   1  I find it more difficult to make decisions than usual.
   2  I have much greater difficulty in making decisions than I used to.
   3  I have trouble making any decisions.

15. Loss of Energy
   0  I have as much energy as ever.
   1  I have less energy than I used to have.
   2  I don’t have enough energy to do very much.
   3  I don’t have enough energy to do anything.
**Beck Executive Function Items**

17. **Irritability**
- 0  I am no more irritable than usual.
- 1  I am more irritable than usual.
- 2  I am much more irritable than usual.
- 3  I am irritable all the time.

19. **Concentration Difficulty**
- 0  I can concentrate as well as ever.
- 1  I can’t concentrate as well as usual.
- 2  It’s hard to keep my mind on anything for very long.
- 3  I find I can’t concentrate on anything.
Depression Intervention

Depression is responsive to:

- Exercise & diet & sleep
- Goal-directed approximations of success
- Encouragement
- Ongoing stress
- Unexpected failure
- Medicine – good and bad
REMEDIATING EF DEFICITS

“Just-Right Challenge”
- Lessons from Education
  - Lexile calibration of reading material.
  - Self-direction of students to identify just-right challenge.
- Goaling Process
- Motivational Interviewing
- Work Sample Testing
  - Normative comparisons
  - Self-referent baseline comparisons
JUST-RIGHT CHALLENGE

“When the demands of a meaningful task slightly exceed current ability.”

Defining the just-right challenge.

- Lexile calibration of reading material.
- Self-direction to identify just-right challenge:
  - “Choose a book that interests you …
  - Read the first full page of the book …
  - If you can read everything, choose a more difficult book …
  - If you make more than 5 errors, choose an easier book.”
JUST-RIGHT CHALLENGE IN REHAB

- Establish meaning with client:
  - Goaling Process
  - Motivational Interviewing
- Provide demand-calibrated tasks:
  - Work Samples
  - Situational Assessments
GOALING PROCESS

“What do you want most out of your life?”
- Professional is scribe, providing “unconditional positive regard”.
- 12 to 15 Goal Statements
- Reverse prioritization
- Publishing to 20 people with whom the client is doing life and wants to be accountable.

Reference:
**Motivational Interviewing**

“How can I help you? / What would you like to be different?”

- Express empathy; understand client’s perspective.
- Develop discrepancy; explore discrepancies between wants and behaviors and attitudes.
- Roll with resistance; reluctance to change is natural.
- Support self-efficacy; explicitly embrace autonomy.

Reference:

**Work Sample Testing**

- **Occupational Readiness**
  - Use O*NET or DOT databases or job description for information about occupational demands.
  - Select tests that are relevant to occupation.
  - Administer, score, and help client interpret results in terms of readiness to handle increased challenge.
  - Help client identify how to improve.
  - Schedule these strategies.
  - Re-test when client is ready, and continue to develop occupational readiness.