- If you are viewing this course as a recorded course after the live webinar, you can use the scroll bar at the bottom of the player window to pause and navigate the course.
- This handout is for reference only. Non-essential images have been removed for your convenience. Any links included in the handout are current at the time of the live webinar, but are subject to change and may not be current at a later date.

Strategies for Treating Patients with Neurobehavioral Disorders

Kelli Broussard, MS, CCC/SLP
Kelly Ramsey, MS, CCC/SLP

Learner Objectives

- Identify three predictable profiles of anatomical brain regions and associated behavioral changes.
- Describe three significant psychosocial impacts of TBI.
- Outline three strategies to achieve effective treatment sessions when working with patients with behavioral issues related to TBI.
- List three key components of Positive Behavior Interventions and Supports.

4

Course Overview

- Review of Traumatic Brain Injury
- Neuroanatomical Profiles resulting in Challenging Behaviors
- Review of Challenging Behaviors and Psychiatric Diagnoses after TBI
- CTE and Blast Injury
- Treatment Strategies for Behavior Management

5

Group Check In!

- POLL: What's Your Setting? Acute, Inpatient Rehab, Post Acute Rehab, Outpatient, SNF, Home Health

6

Impact of TBI

- 1.7 million TBIs annually
- Prevalence of Challenging Behaviors
  - Range from 35% - 70%
  - Increase over time
- Psychosocial Impact of Behaviors
  - Increased care needs
  - Reduced family re-integration
  - Reduced educational and vocational integration
  - Decreased community participation

(Sabaz et al., 2014) (Ylvisaker et al., 2005)

7

Types of Brain Injury

- Closed Head Injury
  - Direct Impact
  - Acceleration-Deceleration
- Blast Injury
- Penetrating Injury

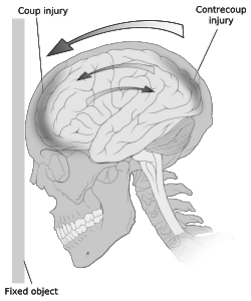
(Bigler, 2000) ("Common Classifications of TBI," n.d.)

8

CONTINUED

Coup-Contrecoup Injury

- Contusions at the site of impact and opposite side
- Direct Impact
- Acceleration-Deceleration

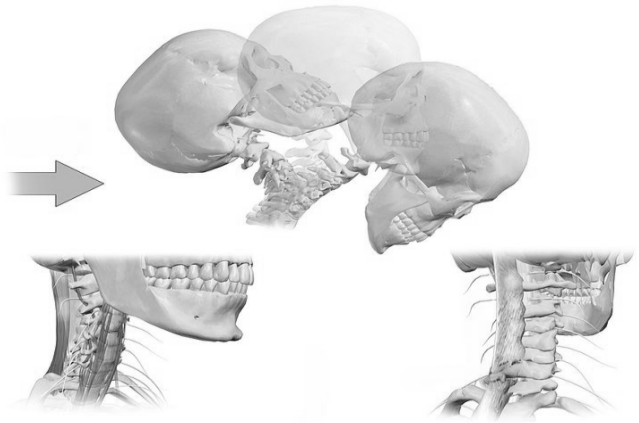


https://sites.google.com/a/ccvikings.com/all-about-concussions/_/rsrc/1462555929030/services/image.png?height=320&width=279
("Common Classifications of TBI," n.d.)

9

CONTINUED

Acceleration Deceleration Injury



https://commons.wikimedia.org/wiki/File:Whiplash.png (Bruce Blaus)

10

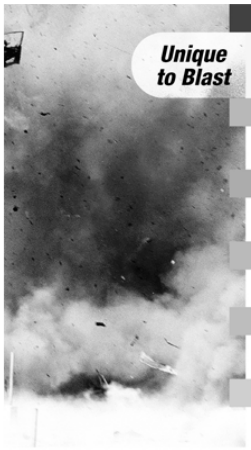
Blast Injury

- "A blast injury feels like being hit by a wave and then being pulled back into the ocean — all in intensely rapid succession" (Jeffrey Barth, PhD)
- "More scientifically, blast injuries result from the complex pressure wave generated by an explosion, an instantaneous rise in atmospheric pressure that is much higher than normal for humans to withstand. This is called a blast over-pressurization wave (CDC, Mass Casualties)."

("Blast Injuries and the Brain," 2017)

11

Blast Injury



Unique to Blast

PRIMARY
- Blast lung
- Eardrum rupture and middle ear
- Abdominal hemorrhage and perforation
- Eye rupture
- Non-impact, blast-induced mTBI?

SECONDARY
- Penetrating ballistic (fragmentation) or blunt injuries
- Eye penetration

TERTIARY
- Fracture and traumatic amputation
- Closed and open brain injury
- Blunt injuries
- Crush injuries

QUATERNARY
- Burns
- Injury or incapacitation from inhaled toxic fire gases

QUINARY
- Illnesses, injuries, or diseases caused by chemical, biological, or radiological substances (e.g., "dirty bombs")

***PSYCHOLOGICAL TRAUMA (including PTSD)**
* Added based on latest research suggesting a high risk of developing PTSD following a concussion

https://blastinjuryresearch.amedd.army.mil/index.cfm?f=application.introduction (Patrick J. Lynch)

12

CONTINUED

Penetrating Brain Injury

- Open wound to the head from a foreign object

Van Horn JD, Irimia A, Torgerson CM, Chambers MC, Kikinis R, et al. (2012) Mapping Connectivity Damage in the Case of Phineas Gage. PLoS ONE 7(5): e37454. doi:10.1371/journal.pone.0037454 ("Common Classifications of TBI," n.d.)

13

CONTINUED

Physiological Damage

- Diffuse Axonal Injury
- Contusions
- Hematomas/ Hemorrhages
- Edema
- Metabolic Injury

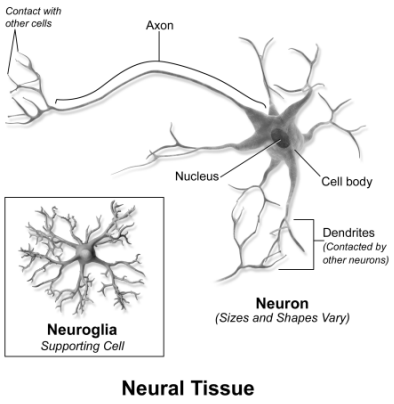
(Bigler, 2001)

14

CONTINUED

Diffuse Axonal Injury

- Shearing of axons
- Caused by shifting and rotating
- Widespread damage throughout the brain
- Gray and white matter boundary



https://commons.wikimedia.org/wiki/File:Blausen_0672_NeuralTissue.png
(Bigler 2001)

15

CONTINUED

Contusions, Hematomas, Hemorrhages

- Cerebral Contusion
  - Frontal and Temporal Lobes
- Hematoma
  - Subdural Hematoma
  - Epidural Hematoma
- Hemorrhage
  - Subarachnoid Hemorrhage

("Intracranial Hematoma," 2018) (Bigler, 2001)

16

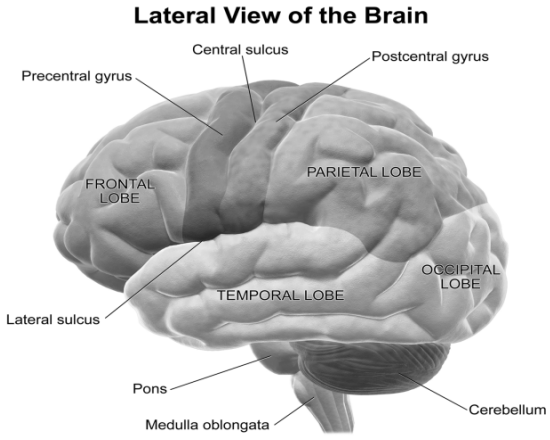
Secondary Damage

- Edema
- Raised Intracranial Pressure
- Excitotoxic Reaction

(Mark et al., 2001) (Bigler, 2001)

17

TBI and Behavior



- Frontal and Temporal lobes most susceptible to TBI

https://commons.wikimedia.org/wiki/File:Blausen_0101_Brain_LateralView.png Bruce Blaus (Caplan et al., 2014)

18

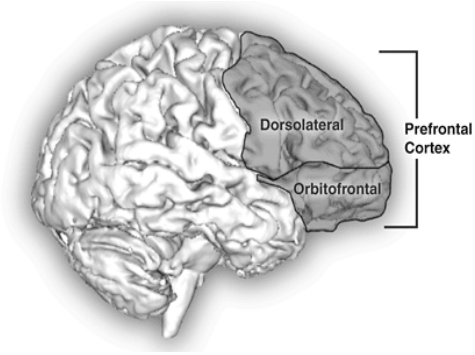
Brain Injury and Behavior

POLLS

- Name the man:
  - A. Phineas Ferb
  - B. Gage Jackson
  - C. Phineas Gage
- What type of Brain Injury do you think he had?
  - A. Blast Injury
  - B. Penetrating Injury
  - C. Coup-Contrecoup

19

Dorsolateral Prefrontal Cortex



Dorsolateral:

- Inflexible or perseverative responding
- Decreased Initiation
- Lack of Emotional Responsiveness
- Reduced Drive
- Loss of Interest

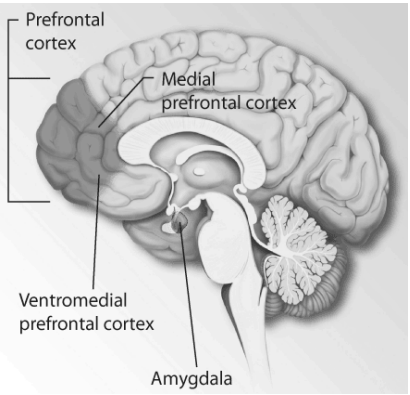
(Bamdad, Ryan, & Warden, 2003) (Radanovic, Mansure, et.al, 2004)
https://upload.wikimedia.org/wikipedia/commons/a/ab/Prefrontal_cortex.png

20

Medial Prefrontal Cortex

Medialfrontal:

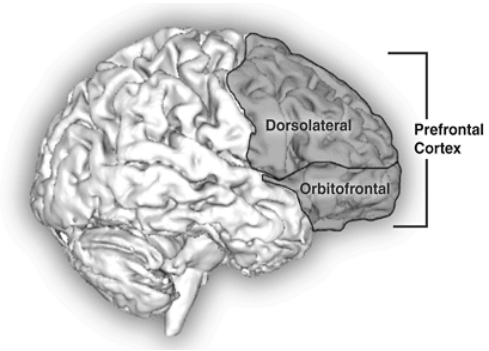
- Damage results in apathetic syndrome
- Diminished responsiveness – problems with initiating or persisting with behavior



https://upload.wikimedia.org/wikipedia/commons/d/d7/Ptsd-brain.png
(Bamdad, Ryan, & Warden, 2003) (Radanovic, Mansure, et.al, 2004)

21

Orbitofrontal Cortex



Orbitofrontal:

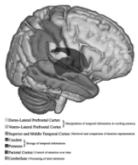
- Integrate the limbic and emotional information into behavioral responses.
- Damage results in abnormal motivation responses- disinhibition, impulsiveness, apathy, socially inappropriate behaviors.

(Bamdad, Ryan, & Warden, 2003) (Radanovic, Mansure, et.al, 2004)
https://upload.wikimedia.org/wikipedia/commons/a/ab/Prefrontal_cortex.png

22

CONTINUED

Ventromedial Prefrontal Cortex



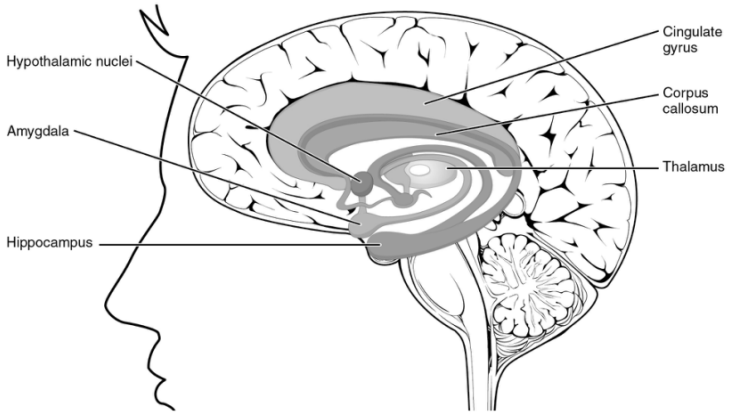
- Frontal Limbic Disconnection
- Proximity to Amygdala

https://commons.wikimedia.org/wiki/File:Explicit_timing_in_the_brain.jpg (Piras, 2017) (Ylvisaker et al., 2005)

23

CONTINUED

Limbic System



https://commons.wikimedia.org/wiki/File:1511_The_Limbic_Lobe.jpg

24

Common Challenging Behaviors

- Agitation
- Aggression*
- Inappropriate Social Behavior
- Lack of Initiation*
- Perseveration*
- Wandering
- Inappropriate Sexual Behavior

(Sabaz et al., 2014)

25

Agitation/Aggression

- Agitation in Posttraumatic Amnesia

- Aggression
  - Reported range 11%-96%
  - Verbal Aggression most common
  - Physical Aggression against self or others
  - Severe irritability – left cortical lesions
  - Orbitofrontal damage

(Sabaz et al., 2014) (Kalra et al., 2017) (Ylviskaer et al., 2015) (McKeon et al., 2017)

26

CONTINUED

Inappropriate Social Behavior

- Reported frequency varies due to lack of consensus
- Disinhibition
- Reduced Impulse control
- Language
- Theory of Mind

27

CONTINUED

Theory of Mind

- Ability to take another's perspective by "reading" that person's mental states and inferring their desires and beliefs (Biovona, et al., 2014)
- Cognitive component of empathy
- Ventromedial Prefrontal Cortex
- Orbitofrontal Cortex

(Bivona, et al., 2014) (Ylvisaker et al., 2005)

28

CONTINUED

Lack of Initiation

- Reported prevalence 40%-71%

https://www.google.com/imgres?imgurl=https%3A%2F%2Fc1.staticflickr.com%2F8%2F7420%2F27499460634_010d24a808_b.jpg&imgrefurl=https%3A%2F%2Fwww.flickr.com%2Fphotos%2Fmarktee%2F27499460634&docid=vyBjF5qJHc9acM&tbnid=4S5onPnAg5ry6M%3A&vet=10ahUKEwispLjyxrbbAhUH0oMKHddoBZcQMwhLKBkwGQ..i&w=1024&h=685&hl=en&safe=images&bih=851&biw=930&as_q=lazy&ved=0ahUKEwispLjyxrbbAhUH0oMKHddoBZcQMwhLKBkwGQ&iact=mrc&uact=8

29

CONTINUED

Common Challenging Behaviors

- Perseveration
- Wandering
- Inappropriate Sexual Behavior

30

Predictors and Correlates

- Correlates
  - Premorbid aggression
  - Ventromedial, Orbitofrontal lesions
  - Executive Functioning deficits
  - Length of time since injury
- Predictors
  - Severity of comorbid mental health problems
  - Pre-Injury alcohol abuse
  - Participation Levels

(Sabaz et al., 2014)

31

Psychiatric Diagnoses related to TBI

- Depression: 44% TBI verses 5.9% general population
- Anxiety: 9% TBI verses 4%
- Bipolar: 4% TBI versus .8%
- OCD: 6.5% TBI verses 2.5%
- PTSD: 14% TBI verses 8%

(van Reekum et al., 2000)

32

CONTINUED

Chronic Traumatic Encephalopathy

- Degenerative brain disease
  - Tau Protein
- Impaired memory
- Impaired Executive Functioning
- Irritability
- Emotional Lability
- Aggression
- Impulsivity
- Suicidality
- Substance Abuse

http://pnl.bwh.harvard.edu/education/what-is/chronic-traumatic-encephalopathy/, (Dickstein et al., 2016) (Farah et al., 2018)

33

CONTINUED

New Discoveries in PTSD and IEDs

- Veteran Brian Mancini
  - Survived primary, secondary, and tertiary blast injuries
- Compared TBI, CTE, Blast Injury
- In Veterans only: Scarring noted on interface between gray and white matter, throughout the brain
- https://www.cbsnews.com/news/brian-mancini-brain-how-ieds-may-be-physically-causing-ptsd/

34

Group Check In!

- POLL:

- What behaviors do you frequently work with?
- What behaviors do you find most challenging?

35

Addressing NeuroBehavioral Issues *The Ground Rules:*

- Learning Principals still apply:
  - *increasing motivation/relevancy increases learning success*
- Recognize the humanity - presume potential
- Recognize that you as clinician will need to step back and analyze your own role in each encounter
- Must account for connectedness – home, clinic, therapists, family
- *The key is to find the individual's intrinsic motivator!*

36

Don't forget the obvious!

- Diet
- Sleep Hygiene
- Pain Management
- Review any medications for possible sensitivities/adverse interactions
- Stress management
- Established routines
- Yoga or other physical activity to manage issues such as anxiety.

37

Key facilitative technique is to decrease cognitive demand to increase individual's ability to manage self.

38

Communication Strategies

- Modify the goals of session to account for increased time needed for communication
- User fewer words and slow rate of speech
- Simplify instructions
- Provide written and visual instructions
  - Use key words
- HEP with pictures of the patient

39

Attention Strategies

- Environmental changes
  - Lighting
  - Visual Distractions
  - Auditory Distractions
- Ear plugs
- Sunglasses
- Frequent breaks

40

Attention/Self-regulation Strategies

- Planned time on task with regularly scheduled breaks reinforced by a timer
- Increase time on gradually to improve cognitive endurance
- Eliminate demand for multi-tasking as much as possible
- Increase sensory stimulation gradually and use compensatory tools for sensory oversensitivity
- Practice shifting attention for focused intervals
- Sleep hygiene and readiness to wake

41

Memory Strategies

- Make the sequence rote/automatic through practice
- Give detailed instructions from start to finish for sequencing with pictures if possible
- Placing these tools in most appropriate place to ensure follow through
- Using electronic tools to cue with alarms, schedules, and calendars
- Ensure repetition of the compensatory tool: use multiple modalities to make sure the task is completed
- Divide responsibilities among other family members in a clear and visible way

42

Memory Strategies in the Community

- Provide list of everything they need to take with them
- Have pre-planned transportation or have already input directions into GPS app
- Have a list pre-prepared of what needs to be accomplished so nothing forgotten- check off items as completed
- Use electronic tools to record directions, note taker, or mental repetition to encode
- PRACTICE: Goal – Plan – Do – Review

43

Organizational Strategies

- Develop routine of functional daily activities
- Implement scheduling system which is individualized to the patient
  - Ex 1: Develop task list, estimate how long each task will take, estimate fatigue level, prioritize, schedule
  - Ex 2: Develop list of productive activities, schedule 1-2 per day as able
- Breaking down large tasks into smaller pieces to prevent frustration/overwhelm
- Create an organized space

44

Right Therapy at the Right Time

- Get Neuropsychologist on board
  - Assess situation
  - Provide appropriate counseling and establish therapeutic approach
  - Develop Team Behavioral Plan
- Long standing evidence shows that outcomes are improved with psychotherapy (Prigatano et al 1984; 1994; 1999;Klonoff et al, 200; Ben-Yishal et al, 1985)

45

Crisis Mode

- Imperative that anyone showing signs of suicidal or high-risk behaviors be referred for an appropriate assessment by a mental health professional.
- Develop a Family Emergency Plan to serve as a touchstone for treatment planning during a crisis.
  - Has individual lost control?
  - Is individual unable to follow instructions to calm down?
  - Is there a strong possible that some could be hurt physically?
  - Is someone in immediate danger because of the out of control behavior.

46

The Stigma of Disability

- "Stigma" is that which causes someone to be a less desired member of a group
- Perceived stigma of one's brain injury can result in:
  - Depression
  - Anxiety
  - Difficulty in community re-integration
- Stigma > Shame > Withdrawal from community

(Poritz, et al, 2018)

47

Compassion Focused Therapy

- Recognition that those with ABI frequently experience anxiety and depression
  - Underlying current of high self-criticism and shame
  - Accompanied by inability to self-soothe
- Growing body of research highlighting the role of compassion in mental health
- Addresses fears, barriers to compassion as well as focus on development of motivation
  - Adaption for ABI includes compassionate texts reminders and alerts, images on mobile phone

(Ashworth, et al, 2015)

48

Therapeutic Approaches

- Historically, Behavioral Treatment in TBI in the 80's relied on ABA – applied behavior analysis
  - Positive reinforcement
  - Planned manipulation of consequences
  - Structured goal/reward can be motivating

CONS:

- Mandates a "reactive" mode of response to behavior
- Injury may prevent ability to learn from consequences
- Failure/frustration/oppositionality reduces contingency management

49

Therapeutic Approaches

- Positive Behavior Interventions and Supports
  - Meet needs of individual
  - Individual is engaged in meaningful, functional activities of which s/he has adequate control (Feeney, 2010)
  - Key goals:
    - Identify function of the behavior
    - Teach adaptive skills
    - Provide environmental supports (Feeney, Ylvisaker, 2003)

CONS:

Some need a more structured approach (ABA)

50

CONTINUED

PBIS

- What does PBIS intervention look like?
  - Provide daily routine/structure
  - Negotiation/choice
  - Predictability
  - Build relationship
  - Build positive momentum by limiting errors = ensure tasks are within capability, provide modeling and assistance to ensure success
  - Encourage escape communication ("I need a break")
  - Goal-Plan-Do-Review vs performance oriented quiz

(McGee, 2017)

51

CONTINUED

Cognitive-Behavior Therapy (CBT)

- Thoughts/beliefs influence emotion and behavior
- Behavioral reactions influence cognition and emotion
- Biological/environmental/interpersonal affect cognition and behavioral reactions
  - Set realistic/measurable goals
  - Identify and modify automatic unhelpful thoughts
  - Psycho-education, relaxation/stress management

(McGee, 2017)

52

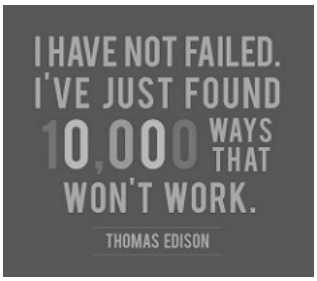
CBT

- PROS:
  - Positive outcomes for anxious, depressed survivors
  - Better for addressing behavioral components vs cognition
- CONS:
  - Cognitive Restructuring is cognitively demanding

53

Skills training

- Efficacy occurs with generalization
- Best when applied directly to real life situations/activities/problems with support to reinforce strategies



54

Make the Plan Fit the Ability

- Be aware of the cognitive and physical demand of tasks
- Routinization/predictability reduces cognitive demand
- Reduce external distractions
- Maximize independent function wherever possible to promote confidence

55

Poll

- Time Out –
  - Where does your therapy usually occur?
    Large gym, patient room, smaller gym space, outdoors?

  How do you think the setting influences behavior?

56

Post Traumatic Amnesia – *Emerging from Coma*

- Need secure, supervised environment
  - Quiet, calm, consistent
  - Avoid overstimulation –
    - Calm lighting, comfortable sounds
    - During treatment sessions, gradually introduce stimulation one at a time, observing for responses
  - Evaluate impact of visitors,assessment, and therapy and limit when they cause excessive fatigue or agitation

(Ponsford et al., 2014)

57

PTA - Emerging from Coma

- Allow rest breaks
- Minimize use of restraints and allow free movement
- Consistent healthcare professionals
- Establish most reliable means of communication
- Frequent Reassurance
- Present familiarizing information
- Timed Toileting
- Family Education

58

Rancho IV Agitation

- Excess of behavior that includes some combination of aggression, disinhibition, akathisia, disinhibition, and emotional liability.
- Follow low stimulation protocol for PTA
- Follow structured plan initiated by neuropsychologist
- Be mindful of personal space/safety. Use de-escalation techniques.
- Minimize or cover tubes/lines
- Frequent re-orientation

59

- Educate staff and family on how to approach TBI patient
  -Use social greetings: these are cues to relax
  -Speak calmly, slowly, briefly, clearly, and directly
  -Do not need to correct confused statements. Instead of disagreeing, make a neutral statement or re-direct attention to another topic
- Explain what you are going to do before you do it (e.g. vitals, procedures, physical exam, etc
- Avoid sudden grabbing or touching of the patient. Approach from the front.
- Do not crowd patient
- Formally end the interaction as patient may not be aware of normal social cues

(Khan, 2015)

60

- Provide patient with choice instead of command.
- Therapies in quiet area, at bedside
- Positive reinforcement
- Give patient ample time to process information and formulate responses.
- Break down difficult tasks into small steps

(Khan, 2015)

61

Therapist as Coach

Integrating approaches to create a practical strategy

62

CONTINUED

Dynamic Coaching

Collaborative Intervention that partners with individual to facilitate self-regulation

Four Key Components:

1. Build Relationship
2. Model and Facilitate Self-Regulation
3. Use natural Learning and Outcomes
4. Teach Self Regulation

(Kennedy, 2017)

63

CONTINUED

Dynamic Coaching

As a "Coach" your role is to:

1. Express Empathy
2. Develop Discrepancy (between current status and goal)
3. Roll with Resistance (avoid direct confrontation and argument)
4. Support Self –Efficacy (one's ability to complete a task)

(Kennedy, 2017)

64

CONTINUED

Dynamic Coaching

1. Build Relationship
2. Model and Facilitate Self-Regulation
   - Partner with individual to set goals and plan
     - Gather pertinent information (survey problem)
     - Interpret and plan (build goals and scaffolding)
     - Support and instruct
       - Self learn/self manage/self advocate
     - Independence (self-regulate!)

65

CONTINUED

Build relationships

- Mutual respect
- Believe that the individual with disability holds "valuable, idiosyncratic knowledge about themselves based on their past and to some extent their present"
- Collaborative, goal-oriented, incorporating language of change
- Drive language around individual's own goals and use positive, motivating language to elicit reaching those goals

(Kennedy 2017)

66

CONTINUED

Natural Learning and Outcomes

- Use real life situations to bring on the challenges
- Utilize settings to allow for quick routine decisions (which route should I take?) as well as slow, more effortful (should I go to college?)
- Context based learning in natural environment enhances learning of new information - supported by research evidence

(Kennedy, 2017)

67

CONTINUED

Teach Self Regulation

A. Goals: Identify potential. Select doable.

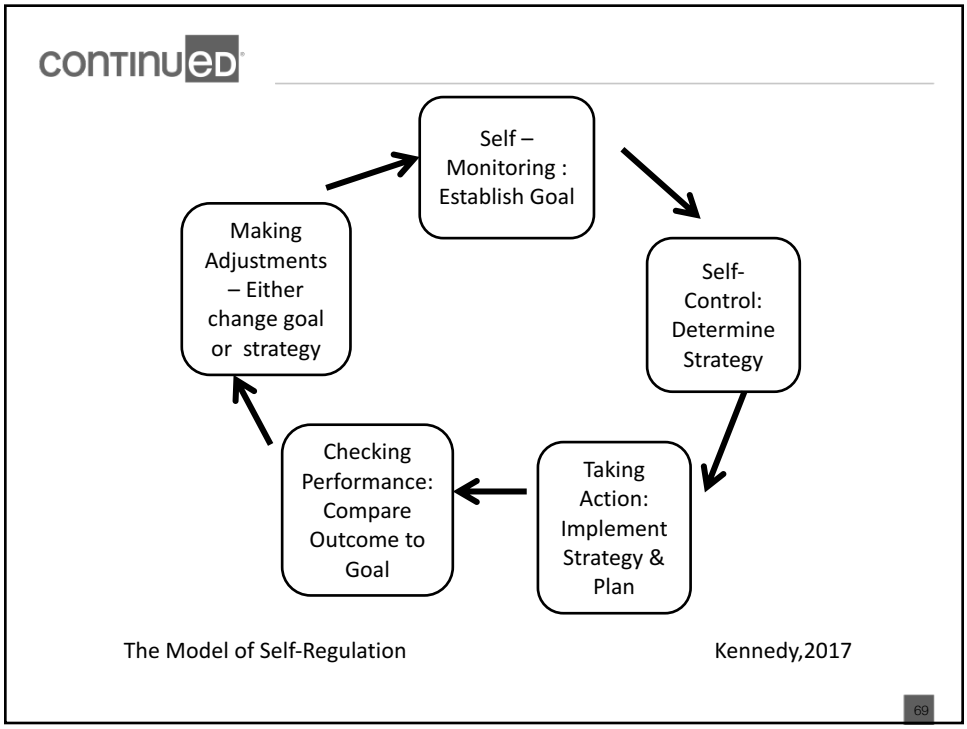
B. Strategies: Identify potential. Select optimal and back up. Learn the strategy. Create the steps/materials.

C. Action: Initiate the strategy steps, Track the strategy use, Track performance

D. Adjust: Compare performance to goal, Adjust goal and/or strategy, Apply to other situations

E. (Kennedy, 2017)

68



The Model of Self-Regulation Kennedy,2017

69

Apply Your Knowledge

70

- She won't eat – even though there is a refrigerator full of food!
- He just sits on the couch day in and day out.
- She won't take care of her own kids.
- He never even touches his home program.

71

Clearly an initiation issue…

72

First – Establish Motivation

- Patient centered approach vital to find the intrinsic motivation to move
- Tip of the Day: Most people do not find a list of chores to be motivating!

73

Address Initiation

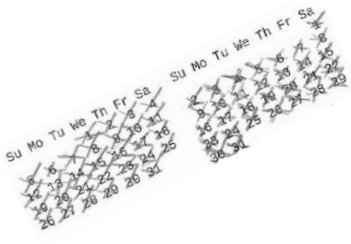
- Generate strategies with patient:
  - First: 1:1 assistance to develop and implement
    - Routine
    - Checklists
    - Alarms
    - Accountability Measures

  Once established, progressively implement greater independence through use of verbal cues, alerts, etc

74

CONTINUED

"Seinfeld Strategy"



"After a few days, you'll have a chain. Just keep at it and the chain will grow longer every day. You'll like seeing that chain, especially when you get a few weeks under your belt. Your only job is to not break the chain…"

Get a wall calendar with
a whole year on one page –
Put a big red X on every day you complete your task

75

CONTINUED

A few apps to try for accountability….

Chains.cc 4+
Siirre Transplants
★★★★½ 4.5, 111 Ratings
$1.99

Momentum Habit Tracker

But – beware of apps that require a monetary penalty for not reaching goals.

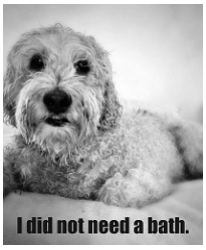
76

CONTINUED

- He refuses therapy.
- She argues with me about needing to use strategies.
- He says there is nothing wrong with him.
- She wants to discharge – isn't that her right?

77

Deficit Denial



78

CONTINUED

Deficit Denial

- Be empathetic to the reluctancy
- Build confidence by building strengths to compensate for areas of weakness
- Identify with individual what the pros and cons of are of current "situation"

- Enlist Dynamic Coaching

79

CONTINUED

- Providing direct feedback, clinical observations, and unbiased testing data to bring awareness to deficits
- Provide opportunity for self observation or group interaction to bring awareness to deficits
- Engaging social support systems to provide feedback
- Teaching one to stop mid-activity, evaluate effectiveness, and adapt approach if needed

(Schrijnemaekers, Smeets, Ponds, Heugten, & Rasquin, 2014)

80

- He tries to grab me every time I walk by
- Constantly staring at my chest
- Asks me out
- He makes me uncomfortable by always talking about sex

?

81

Sexual Inhibition

82

Strategy

- Maintain clear boundaries
  - Keep a working relationship
  - Plainly state boundary to patient
  - Explain what you are doing and why

(Simpson, 2006)

83

Follow a prohibition about one behavior with an alternative:

"its not ok to talk about my lips, it is ok for us to start therapy by you checking to make sure your brakes are locked and swinging away your leg rest"

84

- I was feeding him and he spat on me!
- He started yelling at his wife for no reason.
- We were walking down the hall, and he just started punching the walls
- He scares me.

?

85

Aggressive Tendencies

86

Aggressive Tendencies

- Not just "aggression" – rather a combination of behaviors: disinhibition, emotional lability, motor restlessness, perceptual disturbances, attention deficit, poor impulse control.
- After TBI, hostile or explosive aggression is more common than goal directed aggression.
- Neuropsychology and MD important members of team to implement behavior plan and to consider potential mood stabilizers

87

Mood Stabilizers

- Carbamazepine
- Lamotrigine
- Lithium
- Valproic Acid

88

CONTINUED

TCH and Aggression

- Case study showed positive response to TCH in one case of TBI that was not otherwise responding to mood stabilizers
- Self-harm, head banging, verbal aggression all significantly reduced after TCH initiated.
- Further studies needed

(Quinn 2016)

89

CONTINUED

Aggressive Tendencies

- Recognizing when someone is escalating and when its time to back off is important.
- Step away, allow cool off time, engage differently.
- Consider change of task or venue
- Reconsider what the priorities are for the session
- Maintain safety of self, individual, others
- Follow behavior plan
- Ensure Family Emergency Plan is in place

90

CONTINUED

"Drop by Drop the water pot is filled"….

91

CONTINUED

92

CONTINUED

References

Ashworth, F., Gracey, F., Gilbert, P. (2015) Compassion Focused Therapy After Traumatic Brain Injury Brain Impairment. Cambridge.org.

Bigler, E. (2001). The lesion(s) in traumatic brain injury: implications for clinical neuropsychology. *Archives of Clinical Neuropsychology*. 16(2001)95-131

Bivona, U., Riccio, A., Ciurli, P., Carlesimo, G. A., Donne, V. D., Pizzonia, E., . . . Costa, A. (2014). Low Self-Awareness of Individuals With Severe Traumatic Brain Injury Can Lead to Reduced Ability to Take Another PersonÊ¼s Perspective. *Journal of Head Trauma Rehabilitation, 29*(2), 157-171. doi:10.1097/htr.0b013e3182864f0b

Blast Injuries and the Brain. (2017, May 27). Retrieved from https://www.brainline.org/article/blast-injuries-and-brain

Chronic Traumatic Encephalopathy. (n.d.). Retrieved from http://pnl.bwh.harvard.edu/education/what-is/chronic-traumatic-encephalopathy/

Common Classifications of TBI. (n.d.). Retrieved from https://www.asha.org/Practice-Portal/Clinical-Topics/Traumatic-Brain-Injury-in-Adults/Common-Classifications-of-TBI/

Cusimano, M. D., Holmes, S. A., Sawicki, C., & Topolovec-Vranic, J. (2014). Assessing Aggression Following Traumatic Brain Injury. *Journal of Head Trauma Rehabilitation, 29*(2), 172-184. doi:10.1097/htr.0b013e31827c7d15

Dickstein, D. L., Pullman, M. Y., Fernandez, C., Short, J. A., Kostakoglu, L., Knesaurek, K., . . . Gandy, S. (2016). Cerebral [18â□□F]T807/AV1451 retention pattern in clinically probable CTE resembles pathognomonic distribution of CTE tauopathy. *Translational Psychiatry, 6*(9).

Farah, G., Siwek, D., & Cummings, P. (n.d.). Tau accumulations in the brains of woodpeckers. Retrieved from http://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.0191526

Hamilton, J. (2017, May 21). Why Brain Scientists Are Still Obsessed With The Curious Case Of Phineas Gage. Retrieved from https://www.npr.org/sections/health-shots/2017/05/21/528966102/why-brain-scientists-are-still-obsessed-with-the-curious-case-of-phineas-gageoi:10.1038/tp.2016.175

Hart, T., Brockway, J., Maiuro, R., (2017) Anger Self-Managemetn Training for Chronic Moderate to Severe TBI: Results of a Randomized Controlled Trial. Journal of Head Trauma Rehabilitation. 32L 319-331

93

CONTINUED

References

Hicks, R. R., Fertig, S. J., Desrocher, R. E., Koroshetz, W. J., & Pancrazio, J. J. (2010). Neurological Effects of Blast Injury. *The Journal of Trauma: Injury, Infection, and Critical Care, 68*(5), 1257-1263. doi:10.1097/ta.0b013e3181d8956d

Intracranial hematoma. (2018, May 01). Retrieved from https://www.mayoclinic.org/diseases-conditions/intracranial-hematoma/symptoms-causes/syc-20356145

Jorge, R. E., & Arciniegas, D. B. (2014, March). Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3985339/

Khan, M (2015) Retrieved from: http://static.ark.org/eeuploads/spinal-cord/ATRPGuidelinesForAgitation.pdf

Kalra, I. D., & Watanabe, T. K. (2017). Mood Stabilizers for Traumatic Brain Injury-Related Agitation. *Journal of Head Trauma Rehabilitation, 32*(6). doi:10.1097/htr.0000000000000359

Kennedy, Mary (2017) **Coaching College Students with Executive Function Problems.** The Guilford Press.

Lin, H., & Jorge, R. (2017). Treatment of Mood Disorders Following Traumatic Brain Injury. *New Therapeutics for Traumatic Brain Injury,* 307-318. doi:10.1016/b978-0-12-802686-1.00019-5

Mckeon, A., Terhorst, L., Skidmore, E., Ding, D., Cooper, R., & Mccue, M. (2017). A novel tool for naturalistic assessment of behavioural dysregulation after traumatic brain injury: A pilot study. *Brain Injury, 31*(13-14), 1781-1790. doi:10.1080/02699052.2017.1388444

Mark, L. P., Prost, R. W., Ulmer, J. L., Smith, M. M., Daniels, D. L., Strottmann, J. M., . . . Hacein-Bey, L. (2001, November 01). Pictorial Review of Glutamate Excitotoxicity: Fundamental Concepts for Neuroimaging. Retrieved from http://www.ajnr.org/content/22/10/1813

McGee, J. (2017*) Emotional and Behavioral Changes After Brain Injury* presented at the Texas Brain Injury Alliance Annual Symposium, Austin, TX. Used with permission.

Mood and Anxiety Disorders Following Traumatic Brain Injury. (2008, June 01). Retrieved from http://www.psychiatrictimes.com/anxiety/mood-and-anxiety-disorders-following-traumatic-brain-injury

O'leary, C. A. (2000). Reducing aggression in adults with brain injuries. *Behavioral Interventions, 15*(3), 205-216. doi:10.1002/1099-078x(200007/09)15:33.3.co;2-b

94

CONTINUED

References

Poritz, j., Harik, L., Vos,L., et al (2018) *Perceived Stigma and Its Association With Participation Following Traumatic Brain Injury*. **Stigma and Health**. Advance online publication. http://dx.doi.org/10.1037/sah0000122

Piras F, Piras F, Ciullo V, Danese E, Caltagirone C and Spalletta G (2014) Time dysperception perspective for acquired brain injury. Front. Neurol. 4:217. doi: 10.3389/fneur.2013.00217

Quinn, Davin (2016) Medical Cannabis Reduces Agitation After Brain Injury: Case study. *Journal of Neurotrauma.33:3.* 7.1.2016.

Rao, V., Rosenberg, P., Bertrand, M., Salehinia, S., Spiro, J., Vaishnavi, S., . . . Miles, Q. S. (2009). Aggression After Traumatic Brain Injury: Prevalence and Correlates. *Journal of Neuropsychiatry, 21*(4), 420-429. doi:10.1176/appi.neuropsych.21.4.420

Reekum, R. V. (2000). Can Traumatic Brain Injury Cause Psychiatric Disorders? *Journal of Neuropsychiatry, 12*(3), 316-327. doi:10.1176/appi.neuropsych.12.3.316

Sabaz, M., Simpson, G. K., Walker, A. J., Rogers, J. M., Gillis, I., & Strettles, B. (2014). Prevalence, Comorbidities, and Correlates of Challenging Behavior Among Community-Dwelling Adults With Severe Traumatic Brain Injury. *Journal of Head Trauma Rehabilitation, 29*(2). doi:10.1097/htr.0b013e31828dc590

Scheid, R., Walther, K., Guthke, T., Preul, C., & Cramon, D. Y. (2006). Cognitive Sequelae of Diffuse Axonal Injury.*Archives of Neurology, 63*(3), 418. doi:10.1001/archneur.63.3.418

Silver, J. M., Mcallister, T. W., & Arciniegas, D. B. (2009). Depression and Cognitive Complaints Following Mild Traumatic Brain Injury. *American Journal of Psychiatry, 166*(6), 653-661. doi:10.1176/appi.ajp.2009.08111676

Schrijnemaekers, A., Smeets, S. M., Ponds, R. W., Heugten, C. M., & Rasquin, S. (2014). Treatment of Unawareness of Deficits in Patients With Acquired Brain Injury. *Journal of Head Trauma Rehabilitation*, *29*(5). doi:10.1097/01.htr.0000438117.63852.b4

95

CONTINUED

References

Tateno, A. (2003). Clinical Correlates of Aggressive Behavior After Traumatic Brain Injury. *Journal of Neuropsychiatry, 15*(2), 155-160. doi:10.1176/appi.neuropsych.15.2.155

Simpson, G., Orchison, R. (2006) Sexuality after an ABI: Issues and strategies. Retrieved June, 2018 from: http://www.tbistafftraining.info/selfstudy/Module_6/6.6.htm

Ylvisaker, M., Turkstra, L. S., & Coelho, C. (2005). Behavioral and Social Interventions for Individuals with Traumatic Brain Injury: A Summary of the Research with Clinical Implications. *Seminars in Speech and Language, 26*(04), 256-267. doi:10.1055/s-2005-922104

Waldron, B, Casserly L. and O'Sullivan, C. (2012) *Cognitive Behavioral Therapy for depression and anxiety in adults with acquired brain injury. What works for whom?* **Neuropsychological Rehabiliatation** 23(1) 64-101.

Wijenberg, M. L., Stapert, S. Z., Verbunt, J. A., Ponsford, J. L., & Heugten, C. M. (2017). Does the fear avoidance model explain persistent symptoms after traumatic brain injury? *Brain Injury, 31*(12), 1597-1604. doi:10.1080/02699052.2017.1366551

Zaninotto, A. L., Vicentini, J. E., Fregni, F., Rodrigues, P. A., Botelho, C., Lucia, M. C., & Paiva, W. S. (2016). Updates and Current Perspectives of Psychiatric Assessments after Traumatic Brain Injury: A Systematic Review. *Frontiers in Psychiatry, 7*. doi:10.3389/fpsyt.2016.00095

96