WHY EVIDENCE-BASED REHABILITATION?

- I will apply all measures required... avoiding those twin traps of overtreatment and therapeutic nihilism
WHAT IS EVIDENCE-BASED REHABILITATION?

- Application of interventions based on the best available evidence from the scientific literature
- Clinical judgment regarding the relevance and utility of EBR to the individual patient
- Consideration of the patient’s beliefs and values
Cognitive rehabilitation is a system of therapeutic activities, based on brain-behavior relationships, directed to achieve functional change by:

- Re-establishing or reinforcing previously learned patterns of behavior
- Establishing new patterns of cognitive activity through compensatory cognitive mechanisms
- Establishing new patterns of activity through external compensatory mechanisms
- Enabling persons to adapt to their cognitive disability to improve overall functioning
ECOLOGICAL VALIDITY OF COGNITIVE REHABILITATION

- **Acontextualized**: process specific remediation of impairments with little explicit relation to real-life demands
- **Quasi-contextualized**: therapist makes explicit the relation between meta-cognitive awareness and compensations and real-life demands
- **Contextualized**: functional training of skills with explicit relevance to real-life demands
THE TRIPARTITE STRUCTURE OF TREATMENT THEORY. 
ADAPTED FROM HART, T., TSAOUSIDES, T., ZANCA, J. M., WHYTE, J., PACKEL, A., FERRARO, M., ET AL. (2014). TOWARD A THEORY-DRIVEN CLASSIFICATION OF REHABILITATION TREATMENTS. ARCHIVES OF PHYSICAL MEDICINE AND REHABILITATION, 95(1 SUPPL), S33-44 E32
METHOD

- Refinement of questions to be addressed
- Identification of the relevant literature
- Review, analysis, and classification of existing research
- Development of recommendations based on the strength of the available evidence
IDENTIFICATION OF RELEVANT LITERATURE
1980 - 2008

370 published reports of cognitive rehabilitation were fully evaluated and classified
- 65 Class I studies
- 54 Class II studies
- 251 Class III studies
CONCLUSIONS

Combined Reviews

- 68 treatment comparisons
- 2,926 patients
- 49 of 68 (72.1%) show differential benefit of CR compared with alternative
Differential Treatment Effects
Percent of studies showing benefit of Cognitive Rehabilitation compared with alternative:

<table>
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<tr>
<th>Treatment</th>
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<tr>
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</table>
IDENTIFICATION OF
RELEVANT LITERATURE
2009 - 2014

- 118 published reports of cognitive rehabilitation were fully evaluated and classified
  - 42 Class I studies
  - 14 Class II studies
  - 62 Class III studies
LEVELS OF EVIDENCE

Class I

- Well designed, prospective, randomized controlled trials
- Well designed, prospective studies with ‘quasi-random’ assignment to treatment conditions (Ia)
Levels of Evidence

Class II

- Prospective, non-randomized cohort studies
- Retrospective, non-randomized case control studies
- Clinical series with well-designed controls allowing between-subject comparisons
LEVELS OF EVIDENCE

Class III

- Clinical series without concurrent controls
- Case studies with appropriate single-subject methodology and measurements
This paper isn’t even good enough to be wrong.  

Wolfgang Pauli
Practice Standard

- Based on at least one, well-designed Class I study that directly addresses the effectiveness of the treatment
- *Substantive* evidence of effectiveness to support a recommendation that the treatment be specifically considered for people with acquired neurocognitive impairments and disability.
Practice Parameters

Practice Guideline

- Based on Class I studies with methodological limitations, or
- Well-designed Class II studies
- Evidence of *probable* effectiveness to support a recommendation that the treatment be specifically considered for people with acquired neurocognitive impairments and disability
Practice Parameters

Practice Option

- Based on Class II or Class III studies
- Evidence of *possible* effectiveness to support a recommendation that the treatment be specifically considered for people with acquired neurocognitive impairments and disability
# Remediation of Attention

<table>
<thead>
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<th>Study Design</th>
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</table>
Direct Attention Training

- Repeated stimulation of attention will improve impaired neurocognitive systems
- Improvement is not dependent on strategies
- No explicit instruction related to real world tasks
ATTENTION PROCESS TRAINING

SOHLBERG & MATEER

- Specific cognitive components are addressed through analysis of test performance
- Ability to divide cortical functions into distinct entities are assumed
- Therapy tasks are practiced repetitively in order to restore original function
- Therapy tasks are hierarchically organized
- Generalization probes used to assess treatment
- Individualized treatment delivery
Attention Process Training (APT): Foundation

- Hierarchically organized, clinical theory of attention.
- APT I, II
- 5 different tracks:
  - Focused
  - Sustained
  - Selective
  - Alternating
  - Divided
Remediation of Attention: Attention Process Training During Post-Acute Rehabilitation

Sohlberg et al., 2000

- Randomized crossover (Class I) design
- Attention Process Training (APT) versus

“Placebo” Treatment
- Brain injury education, supportive listening, relaxation training.
Attention Process Training
Sohlberg et al, 2000

- Improvements apparent on executive aspects of attention
- Improvements on self-reported lapses of attention
- Patients with relatively intact levels of vigilance more likely to benefit from specific attention process training
- Minimal psychosocial benefits compared with brain injury education
Remediation of Working Attention: Post-acute Treatment

Westerberg et al., 2007 (Class I)

- Automated computer training for working memory after stroke
- Weekly telephone feedback (no other therapist involvement)
- Improvement on untrained attention and working memory tasks as well as self-rated cognitive symptoms
Remediation of Working Attention: Post-acute Rehabilitation

Serino et al., 2007; Westerberg et al., 2007

- Some evidence of benefits from automated / computer-based practice on working memory tasks
- Benefits on ‘executive’ tasks but not vigilance or processing speed
- Improved self-appraisal of cognitive failures
- Compensation vs. neuroplasticity?
ACTIVE COMPONENTS OF COMPUTERIZED ATTENTION TRAINING

- Use of adaptive interventions to adjust task difficulty & maintain challenge
- Feedback inherent in training structure
- Training is “intense, demanding & tiring”
- More effective for patients with relatively preserved cognitive functioning
- Patient motivation and compliance appears to be critical
Principles of Neuroplasticity
NIH Blueprint for Neuroscience Research

- Functional plasticity and recovery is use-dependent
- Requires pairing of sensory input with feedback (top-down modulation) & training-related learning
- Plasticity depends on availability of sufficient residual neural resources
- Motivation and attention can be critical modulators of plasticity
Plasticity of Attentional Network after CA-CR (Kim et al., 2009)
INCREASED FRONTAL FA RELATED TO AMOUNT OF WM TRAINING (TAKEUCHI ET AL., 2010)
ATTENTION PROCESS TRAINING: APT - 3

- Computer administered
- Increased therapist control over stimulus parameters (speed, complexity)
- Modification of hierarchically organized, clinical theory of attention.

Diagram:
- ATTENTION
  - SUSTAINED
  - SELECTIVE
  - WORKING MEMORY
  - SUPPRESSION
  - ALTERNATING
APT – 3 Therapy Principles

1. Organize therapy activities using a theoretically grounded model
2. Provide sufficient repetition
3. Use patient performance data to direct therapy
4. Include metacognitive strategy training
5. Identify and practice functional goals related to attention
Attention Process Training: APT - 3

Re-emphasis on metacognitive strategy training and activities of the therapist:
- Clinical selection of tasks
- Fostering engagement, motivation and awareness
- Interpretation of outcomes
METACOGNITIVE STRATEGIES
SELF-INITIATED OR CLINICIAN PROMPTED

- Task Completion
  - External self-talk
  - Pacing
  - Breathing

- Motivation / Self – Efficacy
  - Internal self-talk
  - Goal setting

- Task Understanding
  - Repeating or clarifying instructions
How hard did your brain work on that exercise?

How motivated were you to complete that exercise?

Click here to Continue
Metacognitive Strategy Training of Attention

- Interventions targeted at specific impairment
  - Working memory
  - Processing speed
- Emphasis on the deliberate and conscious use of compensatory strategies
Clinical Assumptions of Working Memory Rehabilitation

- Attention problems become more pronounced in situations that demand attention to rapidly presented information and/or multiple sources of information.
- Attention can be improved by addressing underlying problems with working memory.
- Patients can be taught to use strategies to help allocate attention resources and manage the rate of information processing.

(Cicerone, 2002)
Remediation of Attention: Post-acute Treatment

Remediation of Working Attention

- N-back training at varying levels of complexity and simultaneous task demands
- Emphasis on allocation of attention resources, management of sequential and multiple task demands in daily functioning
Deficits in processing speed are not amenable to remediation
Increase awareness of errors and relation to slow processing
Compensation for slowed information processing through anticipation and self-management
Reduce experience of ‘information overload’ in daily tasks
TIME PRESSURE MANAGEMENT

1. Enhance the patient’s awareness that mental slowness is a critical problem
   • Many activities affected by slowed speed
   • Associated problems
     o Fatigue
     o Forgetfulness
     o Emotional reactions
TIME PRESSURE MANAGEMENT

1. Enhance the patient’s awareness
2. Acceptance and acquisition of TPM Strategy
TIME PRESSURE MANAGEMENT STRATEGY
“LET ME GIVE MYSELF ENOUGH TIME TO DO THE TASK”

Questions to be asked
- Are there 2 or more things to be done at the same time?
- Could I be overwhelmed or distracted?

Main Objective
- To recognize time pressure in the task at hand
TIME PRESSURE MANAGEMENT STRATEGY
“LET ME GIVE MYSELF ENOUGH TIME TO DO THE TASK”

Questions to be asked
- Which things can be done before the actual task begins?
- Make a plan
  - One thing at a time
  - Finish what I start

Main Objective
- To prevent as much time pressure as possible
TIME PRESSURE MANAGEMENT STRATEGY
“LET ME GIVE MYSELF ENOUGH TIME TO DO THE TASK”

Questions to be asked
 What to do in case of unexpected, overwhelming time pressure?
 Make an emergency plan.

Main Objective
 To deal with time pressure as quickly and effectively as possible.
TIME PRESSURE MANAGEMENT STRATEGY
“LET ME GIVE MYSELF ENOUGH TIME TO DO THE TASK”

Questions to be asked
- Plan and emergency plan ready?
- Then use it regularly

Main Objective
- Urging the patient to monitor himself while using the TPM strategy
TIME PRESSURE MANAGEMENT

1. Enhance the patient’s awareness
2. Acceptance and acquisition of TPM Strategy
3. Generalization
   • Application to varied tasks
   • Vary level of difficulty
   • Vary level of distractions
   • Homework and self-monitoring
TIME PRESSURE MANAGEMENT

Fasotti et al., 2000

- Increased use of self-management strategies (interrupting, repeating essential information) after TPM

- Improvements apparent on more complex tasks, but not basic reaction time
ACRM Recommendations for Attention Training

Practice Standard

- Remediation of attention is recommended during post-acute rehabilitation after TBI. Remediation of attention deficits after TBI should include direct attention training and metacognitive training to promote development of compensatory strategies and foster generalization to real world tasks.
ACRM RECOMMENDATIONS FOR ATTENTION TRAINING

Practice Option

- Computer-based interventions may be considered as an adjunct to clinician-guided treatment for the remediation of attention deficits after TBI or stroke. Sole practice on computer-based tasks without some involvement and intervention by a therapist is NOT recommended.
# Remediation of Language

<table>
<thead>
<tr>
<th>Study Design</th>
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<th>2002</th>
<th>2008</th>
<th>2014*</th>
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</table>
RECOMMENDATIONS FOR COGNITIVE-LINGUISTIC REMEDICATION

Practice Standard

Cognitive interventions for specific language impairments such as reading comprehension and language formulation are recommended after left hemisphere stroke or TBI.
RECOMMENDATIONS FOR COGNITIVE-LINGUISTIC REMEDIATION

Practice Guideline

Treatment intensity should be considered as a key factor in the rehabilitation of language skills after left hemisphere stroke
Remediation of Communication Deficits after TBI

- Dahlberg et al., 2007 (Class I)
- Social Communication Skills Training after TBI vs. Deferred Treatment
  - Pragmatic language skills
  - Social behaviors
  - Cognitive abilities
Social Skills Training and TBI

Hawley and Newman, 2006

- Holistic view incorporating cognitive, linguistic and emotional skills
- Emphasis on self-evaluation and goal setting
- Emphasis on group interaction, group feedback and group process
- Family involvement and positive daily routines to generalize social skills
Remediation of Communication Deficits after TBI

Dahlberg et al., 2007 (Class I)

Social Communication Skills
- Communicating needs
- Listening and understanding others
- Interpreting nonverbal communication
- Regulating emotions in social interactions
- Following social boundaries and rules
Remediation of Communication Deficits after TBI

- Dahlberg et al., 2007 (Class I)
  - Significant benefits apparent on
    - 7 of 10 aspects of Functional Communication (blind objective ratings)
    - Social Communication Skills (self-report)
  - Gains maintained at 6 month follow-up
  - Improved life satisfaction at 6 month follow-up
Recommended for Cognitive-Communication Practice Standard

Specific interventions for functional communication deficits, including pragmatic conversational skills, are recommended for persons with TBI
RECOMMENDATIONS FOR COGNITIVE-COMMUNICATION

Practice Option

Group based interventions may be considered for remediation of language and communication deficits after TBI and left hemisphere stroke.
## Remediation of Memory

<table>
<thead>
<tr>
<th>Study Design</th>
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</table>

JFK Johnson Rehabilitation Institute
RECOMMENDATIONS FOR MEMORY REMEDIATION

8 Class I studies with 231 subjects support compensatory memory strategy training for persons with mild memory impairments due to TBI
Remediation of Memory Deficits

Class II and III studies support effects of compensatory strategy training for mild memory deficits but not for persons with severe memory deficits.
RECOMMENDATIONS FOR MEMORY REMEDIATION

Practice Standard

Memory strategy training is recommended for mild memory impairments from TBI, including the use of internalized strategies (e.g., visual imagery) and external memory compensations (e.g., notebooks).
Remediation of Memory Deficits

Thickpenny Davis & Barker-Collow (2007)

- Structured 4 week Group Training
  - Improved knowledge of memory strategies
  - Increased use of memory aides
  - Decreased incidence of memory failures
  - Improved memory performance
RECOMMENDATIONS FOR MEMORY REMEDIATION

Practice Option

- Group based interventions may be considered for remediation of memory deficits after TBI
REMEDIATION OF MEMORY DEFICITS

- Class II and Class III studies
- External compensations superior to memory “retraining” for persons with severe memory difficulties
- Use of memory notebooks may require extensive, structured training with ongoing external support
- Need to consider ease of use, patient preferences
RECOMMENDATIONS FOR MEMORY REMEDIATION

Practice Guideline

- Interventions to promote external compensations and specific skill learning recommended for persons with moderate to severe memory deficits after TBI or stroke
- Direct application to functional activities, not memory abilities, *per se*
RECOMMENDATIONS FOR MEMORY REMEDIATION

Practice Option

- For people with severe memory impairments after TBI, errorless learning techniques may be effective for learning specific skills or knowledge, with limited transfer to novel tasks or reduction in overall functional memory problems.
### Remediation of Executive Function

<table>
<thead>
<tr>
<th>Study Design</th>
<th>1997</th>
<th>2002</th>
<th>2008</th>
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</table>
Dual Process Theory of Behavioral Selection and Regulation
Norman & Shallice
FRONTAL LOBES AND EXECUTIVE FUNCTIONS

STUSS, 2011

- Integration and coordination of motivational, emotional, executive capacities
- Normal performance on standard 'executive' tasks
- Decreased awareness of deception
- Impaired reward/risk processing
- Behavourial/Emotional Self-Regulation
- Lateral/Medial Orbitofrontal Circuit 12
- Slower reaction times on speeded tasks and response suppression tasks
- Inability to sustain time monitoring, word generation, and counting tones
- Increased errors at the beginning of a task
- Increased false alarms
- Increased individual variability within and between tasks and testing sessions
- More errors of all types (decreased sensitivity)
- Impaired variable foreperiod effect
- Impaired ability to count tones under speeded conditions

Metacognition

- Rostral Prefrontal Cortex 10
- Lateral Parietal & Temporal Pole
- rostral-STG mid-STG Insula Amygdala

Energization

- Superior Medial Circuit 9, 24, 32
- Dorsolateral Circuit 9, 46

Executive Function

- Left: Task Setting
- Right: Monitoring
Remediation of Deficits in Executive Functioning

Three Class I, one Class II and seven Class III studies suggest that training of self-management strategies (e.g., self-instruction, self-monitoring) can improve deficits in executive functioning, including reduction of problem behaviors in everyday situations.
Several Class I studies of attention, neglect and memory have incorporated self-instructional training as a component of interventions.
A General Algorithm for Executive Functioning

- Awareness
- Anticipation and planning
- Execution and monitoring
- Evaluation

- Time Pressure Management
- Awareness Training Protocol
- Activity Analysis
- Goal-Plan-Do-Review
- Goal Management Training
MODEL OF AWARENESS
(CROSSON ET AL, 1989)

- Anticipatory
- Emergent
- Intellectual
Awareness and Compensation (Crosson et al., 1989)

- Intellectual awareness deficit
- Emergent awareness deficits
- Anticipatory awareness deficit
- No significant awareness deficit

• External compensations
• Situational compensations
• Recognition compensations
• Anticipatory compensations
Cognitive Orientation to Occupational Performance

1. Therapist demonstrates *client-centered goal setting*
2. Therapist responds to changing clients needs by rescaling goals
3. Client and therapist engage in discussion of goals and performance throughout the session (1 to 3 goals are addressed but no more than 3)
4. Evidence of teaching global cognitive strategy: *Goal-Plan-Do-Review*
5. Therapist encourages client to *articulate a plan* prior to performance
6. Therapist incorporates *guided discovery*: Ask don’t tell; Coach don’t adjust; Make it obvious (scaffolding); One thing at a time
7. Therapist *enables* client to promote independence & self-efficacy
8. Therapist facilitates generation and use of domain specific strategies
9. Specific remediation of component impairments *is not* evident
10. Therapist encourages the client to *check his/her plan* after performing it
11. Evidence of *collaborative (therapist and client) analysis* of performance breakdown
Dorsal Executive System

Ventral Affective System

- dIPFC
- VIPFC
- OFC
- AMY
- MTL MS
- LPC
- OTC
EMOTIONAL REGULATION

- Deficits in affect recognition are common and interfere with response to treatment of executive dysfunction
- Alexithymia common after acquired brain injury
- Bias toward “externally oriented thinking” associated with deficits in emotional regulation
EMOTIONAL REGULATION

- Management of frustration during task performance
- Positive problem orientation
- Clarification of emotional states (CES)
- Goal maintenance and goal interference
RECOMMENDATIONS FOR REMEDIATION OF EXECUTIVE DYSFUNCTION

Practice Standard

Metacognitive strategy training (self-monitoring and self-regulation) is recommended for deficits in executive functioning after TBI, including impairments of emotional self-regulation, and as a component of interventions for deficits in attention, neglect and memory.
RECOMMENDATIONS FOR REMEDIATION OF EXECUTIVE DYSFUNCTION

Practice Guideline

Training of formal problem solving strategies and their application to functional situations is recommended for persons with stroke or TBI during the post-acute period of rehabilitation.
RECOMMENDATIONS FOR REMEDIATION OF EXECUTIVE DYSFUNCTION

Practice Option

Group based interventions may be considered for remediation of executive and problem solving deficits after TBI
# Comprehensive Rehabilitation

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Integration of Cognitive Interventions

- **Modular** treatments are generally aimed at a single cognitive impairment, which delivered alone, might be expected to enhance function in patients with a single or predominant impairment.

- **Comprehensive** or **Holistic** programs typically contain a mix of modular treatments that target multiple cognitive impairments, treatments that address self-awareness of the impact of cognitive deficits, and individual or group therapies that facilitate coping with residual deficits and their social consequences.
"It is meaningless to make rigid distinctions between higher and lower level cognitive functions or between physiogenic and psychogenic factors in emotional disturbances" after brain injury. Thus, neither isolated cognitive remedial exercises to improve attention, memory, and/or other "fragmentary" deficits, nor a focus exclusively on traditional psychotherapeutic interventions, are likely to be effective.
Instead, an effective rehabilitation program must systematically integrate interventions directed at the remediation of cognitive deficits, functional skills, and interpersonal functions. Improvements in functioning are typically accomplished by an improvement in the effective functional application of residual cognitive abilities, rather than restoration of the underlying cognitive deficits, per se.
Process and Outcome in Complex Rehabilitation Interventions

Gracey, Evans & Malley, 2009
RCT OF HOLISTIC NEUROPSYCHOLOGICAL TREATMENT (CICERONE ET AL., 2008)

**STD (n = 34)**
- Individual tx model
- 1:1 therapies
- Interventions directed at restoration of discrete cognitive functions.
- Emphasis on discipline-specific interventions and goals

**ICRP (n = 34)**
- Holistic tx model
- Group structure & process
- Interventions directed at adapting to disability despite cognitive deficits
- Emphasis on practical skills and activity limitations
Intensive Cognitive Rehabilitation Program
Specific Treatment Components
(Effective Ingredients)

- Metacognitive evaluation and self-regulation (Activity Analysis)
- Emotional self-monitoring and self-regulation (CES)
I NTENSIVE C OGNITIVE R EHABILITATION P ROGRAM
A CTIVITY A NALYSIS

- What are the essential parts of the task / activity?
- What abilities and skills will influence completion of the activity?
  - (e.g. cognitive, emotional)
- What about the situation will influence completion of activity?
  - (e.g. deadlines, distractions, lack of information)
- What assistance is needed & available?
- What is the probability of success?
**Cognitive Energy Scale (CES)**

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<td>Not paying attention</td>
<td>Able to focus</td>
<td>Distractible</td>
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<td>Mind is Blank</td>
<td>Mind is Sharp</td>
<td>Mind is Overwhelmed</td>
<td></td>
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<tr>
<td>Inactive</td>
<td>Engaged</td>
<td>Irritable to Aggressive</td>
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RCT OF HOLISTIC NEUROPSYCHOLOGICAL TREATMENT (CICERONE ET AL., 2008)

- Neuropsychological improvement in both treatment conditions
- ICRP produced significant gains in
  - Social Participation and Productivity
  - Self-efficacy for management of symptoms
  - Life Satisfaction
Interventions directed at metacognitive regulation and emotional awareness lead to increased personal self-efficacy for management of symptoms.

Development of positive belief in capabilities, ability to prevent emotional reactions from interfering with goal attainment, and confidence in managing cognitive and emotional symptoms mediate well-being and social participation.
Self-efficacy Beliefs
Cicerone et al., 2004

“To be effective rehabilitation after TBI must address patient’s attitudes and beliefs in addition to their cognitive abilities; remediation of cognitive abilities may have more generalized effects if it increases self-efficacy beliefs as well as trains cognitive skills”
M E C H A N I S M S  O F  A C T I O N

Have a seat Kermit. What I’m about to tell you might come as big shock...
HOLISTIC NEUROPSYCHOLOGICAL REHABILITATION
PROPOSED MECHANISMS OF CHANGE

Self-Efficacy
\[ R^2 = .52 \]

Rational Problem Solving
\[ R^2 = .16 \]

Emotional Regulation Strategies
\[ R^2 = .36 \]
Holistic Neuropsychological Rehabilitation Proposed Mechanisms of Change

Self-Efficacy
\[ R^2 = .46 \]

- Rational Problem Solving
  \[ R^2 = .16 \]
- Impulsivity / Carelessness
  \[ R^2 = .33 \]

- Emotion Regulation Clarity
  \[ R^2 = .40 \]

- Emotional Regulation Strategies
  \[ R^2 = .36 \]
- Emotion Regulation Clarity
  \[ R^2 = .38 \]
Holistic Neuropsychological Rehabilitation Proposed Mechanisms of Change

Perceived Quality of Life
\[ R^2 = .54 \]

Positive Problem Orientation
\[ R^2 = .03 \]

Self Efficacy
\[ R^2 = .46 \]

Emotional Regulation Goal Interference
\[ R^2 = .06 \]

Rational Problem Solving
\[ R^2 = .16 \]

Emotional Regulation Strategies
\[ R^2 = .36 \]
Holistic Neuropsychological Rehabilitation
Proposed Mechanisms of Change

Community Integration

Self Efficacy
Emotional
$R^2 = .10$

Rational Problem Solving
$R^2 = .16$

Emotional Regulation
Goal Interference
$R^2 = .14$

Emotional Regulation
Strategies
$R^2 = .36$
Holistic Neuropsychological Rehabilitation
Proposed Mechanisms of Change

Self-Efficacy
$[R^2 = .46]$

Rational Problem Solving
$R^2 = .16$

Emotion Regulation Clarity
$R^2 = .40$

Impulsivity / Carelessness
$R^2 = .33$

Emotional Regulation Strategies
$R^2 = .36$

Emotion Regulation Clarity
$R^2 = .38$
Holistic Neuropsychological Rehabilitation Proposed Mechanisms of Change

Perceived Quality of Life
[R^2 = .54]

- Positive Problem Orientation
  [R^2 = .03]
- Self Efficacy
  [R^2 = .46]
- Emotional Regulation
  Goal Interference
  [R^2 = .06]

  - Rational Problem Solving
    [R^2 = .16]
  - Emotional Regulation Strategies
    [R^2 = .36]
Recommendations for Comprehensive-Holistic Cognitive Rehabilitation

Practice Standard

Comprehensive-holistic neuropsychological rehabilitation is recommended during post-acute rehabilitation to reduce cognitive and functional disability for persons with moderate to severe TBI.
Recommendations for Comprehensive-Holistic Cognitive Rehabilitation

Practice Option

Integrated treatment of individualized cognitive and interpersonal therapies is recommended to improve functioning within the context of comprehensive neuropsychological rehabilitation program, and facilitate the effectiveness of specific interventions.
CLINICAL APPLICATION OF THERAPEUTIC TRIALS

“We need to decide which approach in our large therapeutic armamentarium will be most appropriate in a particular patient, with a particular stage of disease, and particular co-existing conditions, at a particular age...even when RCTs have been performed ...they will often not answer this question...” (G. Thibault, 1993)
DISCUSSION
Without therapeutic enthusiasm, there is no innovation. Without skepticism, there is no proof.

V. Hachinski, 1990