INCOG 2.0 Guidelines for Cognitive Rehabilitation Following Traumatic Brain Injury: What’s New?

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On behalf INCOG 2.0 team
Objectives

By the end of the presentation participants should be able to:

I. Describe the process of development of the INCOG guidelines.

II. Name new updated recommendation topics from the guideline.

III. Discuss how the INCOG clinical algorithms could be used to tailor treatment to individuals with TBI.
Overview

- Intro to INCOG methods and updates (how we did our work)
- What’s new since 2014?
- Review of each of the topics (PTA, Attention, Memory, Executive Functions and Cognitive-Communication)
  - a. New evidence
  - b. Review of recommendations highlighting rationale for new recs
  - c. Review of algorithm highlighting rationale for revised algorithm
- Barriers and Facilitators to implementation
- Questions
Introduction

- **INCOG** = *International Cognitive Rehabilitation Guidelines after Traumatic Brain injury (TBI)*
  - Arose from a workshop that prioritized the topic for Knowledge Translation
  - Initial guidelines published in JHTR in 2014
- Target audience are clinicians working with people who have experienced a Traumatic Brain Injury but may be used by others.
- Population: People with moderate or severe TBI though some studies did include Mild TBI.
International Expert Panel

AUSTRALIA
- Dr. Peter Bragge, PhD
- Professor Jacinta Douglas, MSc (Psych), PhD
- Dr. Adam McKay, MPsych (Clinical Neuropsychology), PhD
- Professor Jennie Ponsford, AO, MA (Clinical Neuropsychology), PhD
- Professor Leanne Togher, B.App.Sc (Speech Path), PhD
- Dr. Jessica Trevena-Peters, DPsych

CANADA/USA
- Dr. Mark Bayley, MD, FRCPC
- Dr. Robin Green, PhD, C.Psych
- Shannon Janzen, MSc
- Amber Harnett, MSc, BSc, BScN, RN (c)
- Dr. Eliyas Jeffay, PhD, C.Psych
- Professor Mary Kennedy, PhD, CCC-SLP
- Ailene Kua, MSc, PMP
- Lyn Turkstra, PhD, Reg-CASLPO
- Dr. Shawn Marshall, MD, MSc, FRCPC

- Amanda McIntyre, PhD (c), RN
- Eleni Patsakos, MSc, PhD (candidate)
- Dr. Robert Teasell, MD, FRCPC
- Dr. Diana Velikonja, PhD, MScCP
- Penny Welch-West, M.Cls.Sc, SLP Reg. CASLPO
- Dr. Catherine Wiseman-Hakes, PhD, Reg. CASLPO

Physicians, Nurses, Psychologists, SLPs, PTs, OTs, etc.
Overview
Bayley et al.

INCOG 2.0 Guidelines for Cognitive Rehabilitation Following Traumatic Brain Injury: What's Changed From 2014 to Now?

- Why is Cognitive Rehab still a priority?
  - 160 new papers (40 RCTS)= Fastest Growing evidence
  - Audits by our team show inconsistent uptake
- The ongoing challenges for implementation of INCOG guidelines
- What’s new
Barriers To Implementation

- **Barriers related to nature of cognitive rehab**
  - Intrinsically complex - assessment of the cognitive strengths/weaknesses of persons with TBI, their priorities, the demands of their environment to provide individualized therapy.
  - Limited training of health professionals.
  - Poorly described interventions in studies.

- **Barriers related to adopters**
  - Limited awareness.
  - Clinicians need implementation tools.
Barriers To Implementation

- **Barriers related to the practice environment**
  - Downing et al. and Nowell et al. highlighted the importance of **client self-awareness**, **family involvement**, **team collaboration**, and **goal setting** as important ingredients for success.
  - Outpatient and community rehabilitation programs, receive limited funding, too brief to fully execute cognitive rehabilitation protocols. Covid has also redirected resources.

- **Barriers related to comorbidities of people with TBI**
  - Mental Health are important challenges.
  - Existing inequity of access for underserved, vulnerable, and racialized populations.
# INCOG 2.0 series

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<td>INCOG 2.0 Guidelines for Cognitive Rehabilitation Following Traumatic Brain Injury Part II: Attention and Information Processing Speed</td>
<td>The Future of INCOG (is Now)</td>
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What’s New – Overall

- Updated Recommendations
- Updated Algorithm
- Updated Audit Tools to monitor implementation
- Updated Cognitive-Communications section with new section on Social Cognition
- New section on Principles of Telerehabilitation and updated sections in specific topics
Methods and Overview
Bayley et al.

INCOG 2.0 Guidelines for Cognitive Rehabilitation Following Traumatic Brain Injury: Methods, Overview, and Principles

- Methodology
- Scope and Purpose
- Target Users/Populations
1. Re-convene International expert panel in Cognitive Rehabilitation (CR).
2. Update literature search.
4. Map evidence and guidelines to the recommendation matrix.
5. Working group meetings to update INCOG recommendations.
6. Update clinical algorithms.
7. Update audit tools to assess adherence to recommendations.
9. Guideline users prioritize recommendations for implementation and auditing.
10. Use audit tools to determine current CR practice.

INCOG 2.0 Recommendations
Adaptation and Development Cycle

*INCOG added process steps
# Levels of Evidence

<table>
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<tr>
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<th>Recommendation supported by at least one meta-analysis, systematic review or randomized controlled trial of appropriate size with relevant control group.</th>
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<tr>
<td>A</td>
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<tr>
<td>B</td>
<td>Recommendation supported by cohort studies that at minimum have a comparison group (includes small randomized controlled trials).</td>
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<tr>
<td>C</td>
<td>Recommendation supported primarily by expert opinion based on their experience though uncontrolled case studies or series may also be included here.</td>
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INCOG 2.0 Recommendations

Breakdown

INCOG 2.0 Recommendations = 80  New = 27

- Cognitive-Communication: 9, 3
- Executive Functions: 8, 4
- Memory: 8, 2
- Attention: 11, 2
- Post Traumatic Amnesia: 6, 3

- Principles: 38, 13
  - Assessment
  - Rehabilitation
  - Pharmacology
  - Telehealth

- Level of Evidence:
  - Level A: 25
  - Level B: 15
  - Level C: 40
Principles of Cognitive Rehab

- 10 recommendations for assessments - not specific tools.
- Intervention principles - focus on individual and meaningful goals.
- Principle #2: Cog rehabilitation should incorporate:
  - Restorative treatments focused on real world activities
  - Training in compensatory strategies
  - Caregiver training
  - Education about cognitive consequences of TBI
  - Functional adaption, and
  - Environmental manipulations.
- Principle #4: Groups for Social skills, Emotional self-regulation, Goal attainment, Problem solving, Communication, Attention, Memory
- **NEW** Principle #6: consider non-pharmacological interventions over pharmacological
Principles Algorithm

Coma
- Consider Amantadine.

Screen for PTA using Westmead PTA Scale.
- Is patient in PTA?
  - Yes: Proceed with full team assessment and rehabilitation.
  - No: Does the patient have severe behavioural disturbances?
    - Yes: INCOG 2.0 Recommendation PTA # 6
      - The use of neuroleptics and benzodiazepines to treat agitation or aggression in individuals with TBI should be minimized, as these medications may slow recovery after brain injury and may have a negative effect on cognition. In general, medications should be limited to those given for more severe levels of agitation and aggression. When medications are required, it is recommended to start low, go slow, and monitor the impact on agitation and cognition using standardized tools.
    - No: Cognitive-communication or social cognition?
      - Yes: Memory impairment severity?
        - Severe: INCOG 2.0 Guidelines for Cognitive Rehabilitation Following TBI Part V: Memory
        - Mild / Moderate: INCOG 2.0 Guidelines for Cognitive Rehabilitation Following TBI Part V: Memory

PTA

Attention

Executive dysfunction

Communication

Memory
Newer Recommendations

- 10 Recommendations for Medication Management.
- **NEW** 5 Recommendations for Tele-Assessment:
  - Suitability, informed consent, equipment availability
  - Preference for videoconference over telephone
  - Use of tools validated for videoconference (preferred)
- **NEW** 7 Recommendations for Tele-Rehab interventions:
  - Timely and equitable care
  - Ideal characteristics of person are: goals are well aligned, has history of following instructions well, has reasonable ability to self monitor and is self-aware and Family support is available.
  - Video conference preferred to visually monitor
  - Hybrid may be necessary.
  - Use groups where there is evidence for in-person.
INCOG 2.0 Guidelines for Cognitive Rehabilitation
Following Traumatic Brain Injury, Part I:
Posttraumatic Amnesia

- New Evidence
- Algorithm
Recommendation re Assessment and Management in PTA

- PTA#1: Post-traumatic amnesia (PTA) assessment of a person with TBI should be performed daily using the Westmead Post-Traumatic Amnesia Scale until resolution of PTA (Updated from INCOG 2014, 53 PTA 1, p. 310). 
  
  Level B. Spiteri et al., 2021

- PTA#2: Provide a safe, quiet and consistent environment with flexible sleeping opportunities (Updated from INCOG 2014)
Therapy Recommendations in PTA

- **NEW PTA#3**: Physical therapists should make efforts to provide therapy to patients in PTA, while flexibly adapting session length, intensity and location based on the degree of agitation, cognitive impairment, and fatigue of the person with TBI (INCOG 2022).
  
  *Level B. Spiteri et al. 2021 a,b*

- **NEW PTA#4**: Swallowing and communication should be monitored by speech language pathologists (SLPs); treating team should use short and simple communication, minimizing repeated orientation and memory questioning (INCOG 2022).
  
  *Level C. Steel et al 2016, 2017; Nielsen et al.,2020 ; Hart et al.,2020*

- **NEW PTA#5**: Individuals with TBI in PTA should receive activities of daily living (ADL) training that is standardized and follows procedural, and errorless learning principles (INCOG 2022).
  
  *Level A. Trevena Peters et al.,2017, 2018, 2019 (RCT); Mortimer et al., 2019*
Medication for Agitation in PTA

- PTA#6: Avoid use of neuroleptics and benzodiazepines
- Manage agitation environmentally as much as possible
- If necessary, start low, go slow and monitor impact on cognition

Level C: Hicks et al., 2018 (Review); Phyland et al. 2022 (RCT); McKay et al., 2020
Posttraumatic Amnesia Algorithm

PTA y/n

Screen for PTA using Westmead PTA Scale.

Is patient in PTA?

Yes

Does the patient have severe behavioral disturbances?

No

Provide a safe, quiet, and consistent environment with flexible sleeping opportunities.

Provide physical therapy to facilitate physical function, considering the individual’s cognitive status and levels of agitation and fatigue.

Provide speech and language assessment and therapy to facilitate swallowing and simple communication, whilst avoiding repeated questioning.

Provide occupational therapy to facilitate activities of daily living independence as tolerated and following procedural and errorless learning principles.

Yes

Avoid the use of neuroleptics and benzodiazepines. Manage environmentally wherever possible. If medication is required, start low, go slow and monitor impact on cognition and agitation.

No

Proceed with full team assessment and rehabilitation.
Attention and Information Processing Speed

Ponsford et al.

INCOG 2.0 Guidelines for Cognitive Rehabilitation Following Traumatic Brain Injury, Part II: Attention and Information Processing Speed

- New Evidence
- Algorithm
Attention Recommendations

- **Att#2**: Metacognitive strategy training using functional everyday activities should be considered for individuals with TBI, especially those with mild-moderate attention deficits (Updated from INCOG 2014,28 Attention 1, p.324-325).
  
  *Level A Time Pressure Management RCT*; Cicerone et al.,2019; Roitsch et al.2018; Virk et al., 2015; (reviews), Dymowski et al., 2016 (case studies)

- **Att#3**: Computer-based de-contextualized attentional tasks for individuals with TBI are **NOT recommended**. Everyday task specific training should be considered but cannot be expected to generalize beyond trained or similar tasks (Updated from INCOG 2014,28 Attention 6, p.326-327).
  
  *Level B* Bogdanova et al., 2016; Cicerone et al., 2019 (reviews), Dundon et al., 2015; Straudi et al., 2017 (RCTs)

- **Att# 4,5,6** No change to recommendations relating to the use of dual-tasking, alterations to the environment, or evidence against recommendation of periodic random alerting or mindfulness-based therapy
NEW Att#8: The use of repetitive transcranial magnetic stimulation (rTMS) and transcranial direct current stimulation (tDCS) to ameliorate attention following TBI is not recommended outside of the context of a research trial protocol (INCOG 2022).

Level B: Ahorsu et al., 2021; Nousia et al., 2022 (reviews); Lee & Kim, 2018; Neville et al., 2019; Rushby et al.;2021 Sacco et al., 2016; Ulam et al., 2015 (RCTs); Boissonault et al., 2021
Pharmacological Recommendations

- **Att#9:** Methylphenidate (initiated at a dose of approximately 0.10mg/kg and increased gradually to a target of 0.25–0.30 mg/kg bid) is **recommended** in adults with TBI to enhance speed of information processing (Updated from INCOG 2014,28 Attention 9, p.328).
  
  *Level A; Barnett & Reid, 2020; Chien et al., 2019, Huang et al., 2016 (reviews) Dorer et al., 2018; Dymowski et al.;2016; Jenkins et al., 2019; Johansson et al., 2015; Manktelow et al., 2017; Moreno-Lopez et al.,2017 ; Zhang & Wang, 2019 (RCTs)*

- **Att#10:** While amantadine may enhance arousal in patients in a minimally conscious state, it should **not** be used to enhance attentional functions following emergence from coma (Updated from INCOG 2014,28 Attention 10, p.328).
  
  *Level A Hammond et al., 2018 (RCT)*

- **NEW Att#11:** The traditional Chinese medicine MLC901 (NeuroAiD IITM) may enhance complex attention in individuals with mild-moderate TBI (INCOG 2022).
  
  *Level A Theadom et al., 2018 (RCT)*
Attention and Information Processing Speed Algorithm

**Attention #6:** Training in mindfulness-based meditation techniques is not recommended for remediation of attention deficits.

**Attention #10:** Amantadine should not be used to enhance attentional functions following emergence from coma.
Executive Functions
Jeffay et al.

INCOG 2.0 Guidelines for Cognitive Rehabilitation
Following Traumatic Brain Injury, Part III:
Executive Functions
- New Evidence
- Algorithm
Recommendations

- Executive interventions are unlikely to be effective without some degree of self-awareness and motivation, so much assess these first.

- EXEC#1: Self-Monitoring and Feedback to Enhance Self-Awareness
  1a. Strategies that encourage self-monitoring of performance and involve feedback should be used with individuals with TBI who have impaired self-awareness.
  1b. Consider self-awareness training such as video feedback to improve the ability to recognize and correct errors during task performance. (Updated from INCOG 2014, EXEC 3, p. 343).

*Level A. Must be domain specific.*
Recommendations

- EXEC#2: Metacognitive strategy instruction (MSI) recommended for problems with planning, problem-solving and organization (e.g., GMT, Goal Plan Do Check). Train step-by-step procedures for:
  - Goal setting & selection
  - Creating general/specific plans
  - Selecting & using strategies
  - Self-assessing (i.e., self-monitoring)
  - Adjust goal and/or plan

Focus on everyday problems and relevant functional outcomes

Level A. 4 new studies Elbogen et al., 2019, Tomas et al., 2016; Siponkoski et al., 2020; Cantor et al., 2014

- EXEC#3: Strategies to improve capacity to analyze and synthesize information for impaired reasoning skills (unchanged from INCOG 2014).

- EXEC#4: Group-based problem solving/planning interventions should be considered
  Now Level A Cantor et al., 2014
Recommendations

- **NEW EXEC#5**: consider a structured music therapy program that includes (1) rhythmical training, (2) structured cognitive-motor training, and (3) assisted music playing that is individualized to the person’s interests and progression through the program (Adapted from ONF-INESS 2015). May increase fronto-parietal connectivity.
  
  *Level A. Siponkoski et al. (2020), 2 RCTs 1 meta-analysis*

- **NEW EXEC#6**: Clinicians consider the use of virtual reality programs, in addition to in-person visits to provide timely and equitable access to care for executive dysfunction (INCOG 2022). (Game-based, task-oriented, or simulation of ADL. Fully, semi-or non immersive). Mixed study quality

- **EXEC#7**: One-to-one remotely delivered interventions (e.g., for goal management training), following telerehabilitation guidelines, recommend if remote delivery is most convenient or only mode of reaching the person (INCOG 2022).
Executive Functions Algorithm

Assure the reasonableness of goals in the context of patient's difficulty

Pre-treatment Assessment
Assess executive functioning (including awareness of deficits) and motivation via interview of patient/caregiver, performance tests and questionnaires, behavioural observations

Aware of deficits AND Motivated?

No

#E1a: Educate client and/or engage in experiential therapy to improve awareness and motivate

#E1b: Self-awareness training (e.g., video feedback) to improve ability to recognize and correct errors during task performance

#E3: Strategies to improve the capacity to analyze and synthesize information should be used with individuals with traumatic brain injury who have impaired reasoning skills

Yes

#E2: Metacognitive strategy instruction is a step-by-step procedure that trains:
- Goal setting and selection
- Creating general/specific plans
- Selecting and using strategies
- Self-assessing (i.e., self-monitoring)
- Adjusting goal and/or plan

#E4: Group-based interventions for remediation of executive and problem-solving deficits

#E5: Structural music-therapy program that includes (1) rhythmic training, (2) structured cognitive-motor training, and (3) assisted music playing that is individualized to the person's interests and progression through the program

Post-treatment Reassessment
Readminister any executive functioning tests/questionnaires

Evaluate functional changes in activities* related to patient goals (as observed by therapist, client, or caregiver/close person)

Note:
* Should include complex activities that involve planning and adjusting to feedback
* Telehabilitation compatible

Exec Dysfunction?

Awareness Motivation

Reassess
INCOG 2.0 Guidelines for Cognitive Rehabilitation Following Traumatic Brain Injury, Part IV: Cognitive-Communication and Social Cognition Disorders

- New Evidence
- Algorithm
Recommendations

Cognitive-Communication #1-4: Assessment and rehabilitation needs to take into account the individual’s

- cultural background
- gender identity
- pre-morbid abilities and communication style
- demands and priorities
- communication partners
- communication environment
- fatigue
- physical and sensory issues

- behavioural, emotional and psychosocial factors

Staff should receive cultural competence training. (Updated from INCOG 2014) Level B
Recommendations

- Cog-Comm#4: Recommended cognitive-communication interventions, can be direct or indirect at any level of impairment and include:
  a. Communication partner training (Level A),
  b. Communication strategy and metacognitive awareness training (Level A),
  c. Reintegration to daily functions, productive activities, participation and competence, modification of the communication environment, and assistance with adjustment to impairments (Level C),
  d. Communication coping treatment (Level C),
  e. Focus on confidence, self-esteem and identity formation (Level C), and
  f. Provision of education and information regarding the nature of acquired cognitive-communication disorders to both the patient and close other and communication partners (Level C) (from INESSS-ONF 2016). Level A-C

- Cog-Comm#5: Provide practice in everyday situations.

- Use Goal Attainment Scaling to measure person-centred outcomes

- Cog-Comm#8: Telerehabilitation is as efficacious for communication partner training as in-person intervention (INCOG 2022). Level B
Recommendations

- Cog-Comm#6: Individuals with severe communication disability following TBI should be provided with proper assessment to determine the appropriate augmentative and alternative communication (AAC) intervention by trained clinicians.
- The individual and close communication partners should be provided with training to effectively use AAC aids.
- This training should be ongoing as needs change and technology evolves.

(Updated from INCOG 2014,23 Cognitive-communication 6, p. 357).
Recommendations

- Social Cognition #1: Clinicians should consider evaluating aspects of social cognition ability, including emotion perception, theory of mind (ToM) and emotional empathy (these interventions are recommended)

- Computerized social cognition treatments are not recommended given lack of evidence of generalization to real life activities (INCOG 2022). Level A

- Cog-Comm#7: Consider group therapy for cog-communication training when social communication impairments exist and goals align. (Updated from INCOG 2014, 23 cog-comm 7, p.361). Level A
Cognitive-Communication Algorithm

Severity

Yes

Severe communication disability?

No

Consider assistive technology for communication and cognition assessment and training by trained clinicians. (This training should be ongoing as needs change and technology evolves.)

If aphasia present, consider aphasia guideline.

Evaluate Communication

Consider physical and psychosocial variables (including gender identity), native, first and preferred languages, literacy and language proficiency, cognitive abilities, communication style (including communication standards and expectations in the person's cultural, linguistic background and tradition).

Routine referral to Speech-Language Pathologist (SLP)

Ind/group therapy

Partner training

Social cognition training

Communication Partner Training (CPT)

Ingredients:
- Teach partners to ask questions in a positive, non-demanding manner
- Teach partners to collaborate in conversation and facilitate communication competence

(Telecommunication - efficacious, feasible and acceptable for CPT).

Social Cognition Training (SCT)

Ingredients:
- Emotion perception
- Theory of Mind (ToM)
- Emotional Empathy

Communication Partner Training (CPT)

Ingredients:
- Client-centred goals
- Tailor therapy to client's cognitive-communication profile

Cognitive-Communication Rehabilitation

The primary goal of management is to facilitate communication competence for the maximum return to full life participation.

Ingredients for all rehabilitation:
- Consider communication partner, environment, communication demands (e.g., time pressure, need to follow multiple speakers)
- Consider communication partner, environment, communication demands (e.g., time pressure, need to follow multiple speakers)
- Consider communication partner, environment, communication demands (e.g., time pressure, need to follow multiple speakers)
- Communication priorities, fatigue, physical and psychosocial variables, and other personal factors
- Hearing and vision screening as well as making accommodations for these foundational sensory input/output (e.g., hearing aids and glasses if available)
- Provide opportunity for practicing and using communication skills in situations appropriate to the context in which the person will live, work, study and socialize
- Management approaches should be individualized, meaningful, goal- and outcome-oriented, person-centred, grounded in the contexts of real life communications and cognitive demands.
- Consideration of client's cultural, linguistic, and gender identity

Ind/group therapy

Partner training

Social cognition training
INCOG 2.0 Guidelines for Cognitive Rehabilitation
Following Traumatic Brain Injury, Part V: Memory

- New Evidence
- Algorithm
Recommendations

- Mem#1: Internal compensatory strategies may be used for individuals with TBI and mild-to-moderate memory impairments and/or some preserved executive cognitive skills.
  - Visual imagery
  - Repeated practice
  - Retrieval practice
  - Preview, Question, Read, State, Test (PQRST)
  - Metacognitive strategies (e.g., self-awareness, self-regulation)

- Multiple strategies is considered effective.

- Individually or group

(Updated from INCOG 2014, 16 Memory 1, p.374).

Level A. Raskin et al., 2019
Recommendations

- Mem#2: Environmental supports and reminders (e.g., mobile/smartphones, notebooks and whiteboards) are recommended for individuals with TBI and memory impairment, especially severe memory impairment. Individuals with TBI and caregivers must be trained to use these supports.

- Selection of environmental supports and reminders should take account of:
  - Age
  - Severity of impairment
  - Premorbid use of electronic and other memory devices
  - Cognitive strengths and weaknesses (e.g., executive cognitive skills)
  - Physical comorbidities
  - Affordability, portability, reliability

(Updated from INCOG 2014,16 Mem 2 and 3, p.378).

Level A: Evald et al. 2015; Ferguson et al., 2015; Charters et al., 2015

- Mem#3: All skills and strategies taught should be integrated into everyday activities; limited evidence to support restorative skills training.
**Recommendations**

- **Mem#4:** Instructional practices to promote learning for individuals with memory impairments:
  - Clearly defined intervention goals
  - Selection and training of goals relevant to person with TBI
  - Allow sufficient time and opportunity for practice
  - Breaking down tasks into smaller components when training multistep procedures
  - Use distributed practice
  - Teach strategies using variations in the stimuli being presented (e.g., multiple exemplars)
  - Teach strategies to promote effortful processing of information (e.g., verbal elaboration, etc.)
  - Use techniques that constrain errors (e.g., errorless, spaced retrieval)
  - Consider memory strategies with a focus on context and imagery in acquisition

(Updated from INCOG 2014,16 Memory 4, p. 379).
Recommendations

- Mem#5: Group-based interventions may be considered for teaching memory strategies, but there is no evidence that it is more effective than individual rehabilitation.
  - Consider reducing heterogeneity in group membership,
  - Encourage participation for an adequate number of sessions and
  - Teach generalization of learned skills

(Updated from INCOG 2014,16 Memory 5, p.381). Level A.
Mem#6: The acetylcholinesterase inhibitor (AChEI), donepezil (Aricept), may be considered for adults with TBI and memory deficits only in the chronic stage of recovery. The effects of the medication should be assessed using objective and functional measures. Patients should be monitored for side effects such as diarrhea, stomach upset and nausea (Updated from INCOG 2014,16 Memory 6, p.381).

*Level A Evidence*

Memory #7: Transcranial direct current stimulation (tDCS) should not be used to improve memory outside of the context of a randomized controlled trial (INCOG 2022).

*Level A Evidence*

Memory #8: Methylphenidate and amantadine should not be used to improve memory (INCOG 2022).

*Level A Evidence*
Memory Algorithm

Severity

Assess and framework

Ind/group therapy

Choose individual and/or group-based interventions.

Use key instructional practices to teach implementation of internal and/or external devices/strategies.

Note: Consider Acetylcholinesterase inhibitors (ChEIs) only if in chronic TBI and using a functional measure to assess impact.
The Future of INCOG (Is Now)

- Getting the question right: Codesigning and prioritizing research questions ensure that research effort is focused on areas where impact is most needed.
- Streamlining the reviews that drive the guidelines: Technology has brought us closer to the “holy grail” of guidelines that are both comprehensive and up to date.
  - Creating an INCOG Eco-system
- Connecting recommendations to practice: The considerable research effort that goes into guidelines is wasted if implementation and connection to practice are inadequate or unsupported.
  - Importance of a Learning Health System
Conclusions

- INCOG Guidelines are a resource to promote cognitive recovery that have been extensively updated with new recommendations, algorithms and audit tools.
- Emergence of telerehabilitation offers promise for improvements in access.
- Considerable efforts are required to continue to overcome the barriers, however, technology can support all phases including synthesis of the evidence, collection of audits and incorporation of algorithms.
THANK YOU
QUESTIONS?

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