Occupation Based Cognitive Rehabilitation for Brain Injury and Stroke

“From the Clinic to the Community”

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The Acquired Brain Injury Population (ABI)

**Traumatic Brain Injury (TBI)**

*Focal* (GSW, penetrating etc.)

**Closed head injuries**
- Post-Concussive Syndrome
- Contusion
- Hematoma
- Diffuse Axonal Injury
- Blast Injuries

**Brain tumors**

**Infectious Disorders**
- Meningitis
- Encephalitis

**Stroke (CVA)**

*Cerebral hemorrhage*
- AVM
- Aneurysm

*Cerebral infarction* (Ischemia) due to:
- Embolism
- Thrombosis

**Anoxic Brain Injury**

Cerebral anoxia due to:
- Respiratory distress
- Blood loss
- Poisoning
My Purpose

My hope is that when you leave today -
you will have some new therapy plans and ideas for your clinic -
you can use tomorrow
Why is this approach different?

The approach being introduced in this seminar is an attempt to bridge the gap between the techniques and goals of traditional cognitive rehabilitation and those of a functional approach that applies to “real-world” performance.
Real World is Relative

We all have different occupational roles in life.

Formally defined, warrior tasks are a collection of individual soldier skills deemed critical to soldier survival, known as battle drills. These participation-level competencies are “complex tasks performed as a part of a unit in order to react and survive in common combat situations” and include a range of activities from dismounted patrolling to casualty evacuation.
Why is this approach different?

• Traditional cognitive rehab (retraining) is based on addressing subskills - attention, memory, executive functions, etc. in isolation

• This approach focuses on improving overall performance in real-life activities and incorporates all of the sub-skills above

• PRACTICING “real-life” tasks and activities results in functional improvement
Traditional Cognitive Rehabilitation Sessions

- **Memory** - retrograde amnesia, short term, prospective, implicit...
- **Attention** – sustained, divided, ...
- **Sequencing** - ideational apraxia...
- **Awareness** – anticipatory, online, ...
- **Problem solving** – simple, complex, ...
- **Reasoning**... inductive, deductive, ...
- **Executive functions** - organization/planning, metacognition, self-awareness...
- **Speed of processing** ...
- **Auditory comprehension of language**, ...
What makes this approach different?

Three **global elements** of functional cognitive activity are emphasized throughout:

1. **Interpersonal relationships**: self awareness
2. **Environment**: the physical space and objects around the person
3. **Time** parameters, schedules, time limits

The person’s performance level is evaluated on his **awareness and management** of these 3 elements rather than scores on cognitive subskills.
The 3 Global Elements

The factors below are considered when measuring progress in the area of time awareness and management:

- Initiation
- Alarm response
- Oriented to time of day
- Following schedules
- Oriented to day/week
- Estimating time
- Task management
- Calendars
- Multi-tasking
- Project deadlines
The 3 Global Elements

The factors below are considered when measuring progress in the area of environmental awareness and management:

- Orientation to place
- Transfers
- Object use
- Visual scanning
- Arranging workspace
- Starting point awareness
- Safety hazards

- Navigating in buildings
- Personal belongings
- Navigation method
- Map use
- Compensatory devices
- Route planning
- Community outings
The 3 Global Elements

The factors below are considered when measuring progress in the area of **interpersonal** awareness and management.

- Initiating communication
- Orientation to others
- Emotion and behavior
- Following commands
- Reading comprehension
- Phone use
- Self regulation

- Pragmatics
- Self-awareness
- Task understanding
- Compensation
- Group behavior
- Error correction
- Insight
Development of This Approach

It became obvious that the person’s awareness and management of the 3 global elements of functional activity…

• Interpersonal relationships with others and self-awareness
• Environment: The physical space and objects around him
• Time parameters

...was equally as important as work on subskills or completing individual tasks!!
<table>
<thead>
<tr>
<th>Level</th>
<th>You're LOST!</th>
<th>You're LATE!</th>
<th>You're WRONG!</th>
<th>Current Awareness Status</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Will use GPS next time</td>
<td>Will have to mark on my calendar next time</td>
<td>Have had trouble taking good notes</td>
<td>Considers future plans</td>
<td>Receptive to criticism</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Insight into diagnosis</td>
<td>Use mood tracker</td>
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<tr>
<td>7</td>
<td>Guess should have planned before I left</td>
<td>Next time I will set alarm so I get up earlier</td>
<td>Thanks for letting me know I will do better next time</td>
<td>Rational verbal responses</td>
<td>Teach verbal strategies</td>
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<td></td>
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<td></td>
<td></td>
<td>Comes up w alternatives</td>
<td>Encourage sleep journal</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Group feedback</td>
</tr>
<tr>
<td>6</td>
<td>Must've taken a wrong turn somewhere</td>
<td>My phone died and I couldn't find a clock</td>
<td>Took a lot longer to get finished than I thought</td>
<td>Reasoning develops</td>
<td>Discuss alternatives</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Identifies multiple deficits</td>
<td>Teach to read social cues</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Awareness questionnaires</td>
</tr>
<tr>
<td>5</td>
<td>Someone gave me wrong directions</td>
<td>You didn’t give me enough time to finish</td>
<td>What's the difference?</td>
<td>Recognizes memory deficit</td>
<td>Validate feelings</td>
</tr>
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<td></td>
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<td></td>
<td></td>
<td>Denial</td>
<td>Video feedback</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Conscious self awareness</td>
<td>Set limits on discussion</td>
</tr>
<tr>
<td>4</td>
<td>Which way should I go?</td>
<td>When was I supposed to get here?</td>
<td>What did I do wrong?</td>
<td>Recognizes physical and sensory deficits only</td>
<td>Re-direct</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Retains new memories</td>
<td>Provide alternative tasks</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Avoid arguing</td>
</tr>
<tr>
<td>3</td>
<td>Where was I supposed to go?</td>
<td>What time is it?</td>
<td>This is too hard!</td>
<td>Oriented</td>
<td>Reinforce orientation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unsettled demeanor</td>
<td>Re-assure</td>
</tr>
<tr>
<td>2</td>
<td>Can't find it!</td>
<td>Didn’t hear bell!</td>
<td>I’m tired!</td>
<td>Cause effect</td>
<td>Provide rest breaks</td>
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<td></td>
<td></td>
<td>Visceral responses to change</td>
<td>Praise/encourage</td>
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<td></td>
<td></td>
<td></td>
<td>Emotional outbursts</td>
<td>Use errorless learning</td>
</tr>
<tr>
<td>1</td>
<td>Propels wrong direction</td>
<td>Ignores prompt</td>
<td>Continues task or exercise</td>
<td>Physical instability</td>
<td>Hand over hand</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sensory disturbances</td>
<td>Provide stability</td>
</tr>
</tbody>
</table>
The Key Point of This Approach:

- Conduct therapy sessions that steer away from work on primary cognitive skills in isolation or compensation techniques in controlled environments.

- Learn to use functional cognitive activities to improve performance in "real-life" environments.

- This is an “educational” approach, (the emphasis is on teaching/learning), rather than a “medical” approach - (treating/healing).
Occupation Based Cognitive Rehab

• “Functional”
• “Performance based”
• “Real life”
• “Occupation based”
An “occupation-based” approach to cognitive rehabilitation (supported by this hierarchy of specific treatment activities) allows the therapist look with a wider view than a narrow focus on underlying brain processes.

Makes use of an intervention process that facilitates engagement in occupation to support participation in life.”
Foundation of this Approach
Cognitive Models for OT


- **Neurofunctional Approach** - Gordon Muir Giles
- **Cognitive Rehab: A Retraining Model for Clients Post BI** – Noomi Katz and Sarah Averbuch
- **Cognitive Disabilities Model** - Claudia Allen
- **Quadraphonic Approach** – Beatrice Abreu
- **A Dynamic Interactional Model to Cognitive Rehab** – Joan Toglia
Transdisciplinary Effort

• Trans-disciplinary approach – all disciplines converge to work on the same functional goals

• All members of the team provide practice using compensatory techniques during their sessions: checklists, planners, timers/alarms, navigating skills, relationship skills, strategies, external aids, schedules
Transdisciplinary Effort

• This approach emphasizes **PRACTICE**… repeated opportunities to participate in graded real-life **tasks** and **activities**

• To make this happen, each discipline incorporates the 3 global elements of functional activities into **sessions**

• Team members share ideas to **target treatment focus**

• Dynamic, fun approach to cognitive rehab
Development of This Approach

Started by realizing that I needed to do more ‘functional’ therapy tasks and activities

Began by getting away from:
- pencil and paper worksheets,
- visual perception kits
- puzzles
- “what if” role-playing situations
- computer quizzes

Started substituting tasks
What Opportunities Does Your Environment Afford?
Activity Logistics

• A significant amount of up front work is required to establish this approach
• You will need to have many, varied tasks available
• Advance preparation is important
• You will need to move around the environment
• Things can be unpredictable outside the clinic
• You will learn something new each time you try one of these activities

**Step** = one part of a task
- “Stand up” “Put water in pan” “Put pan on stove” “Add rice”

**Task** = a series of related steps that lead to a goal
- “Prepare rice” or “Build birdhouse”
- Tasks can be “1-step” or “multiple step tasks”

**Activity or Session or Lesson** = a collection of tasks
- Cook spaghetti, then make phone calls, then make salad, then iron shirts, then write checks for bills

**Level** = a group of related activities, sessions or lessons
This Approach Emphasizes “Functional” Activities

• “Functional” activities can be defined differently for each of our disciplines

• OT emphasis - started out by creating a “Functional Therapy Activities” CD

• The CD was based on grouping activities by problem or category

• As I started to concentrate on cognitive problems – I realized that functional activities can be arranged by cognitive “level”
8 Levels of Cognitive Functioning

Level 8. “Planning/Multi-Tasking”
Level 7. “Out the Door”
Level 6. “Organize the Therapy Session”
Level 5. “Beyond the Room”
Level 4. “Follow a Time Schedule”
Level 3. “Looking Around the Room”
Level 2. “What Time is It?”
Level 1. “Initiating the Next Step”
8 Levels of Cognitive Functioning

Levels of functioning addressed in this approach:

*Levels 7-8: High* (Outpatient, Day Programs, On job training)
Executive Functions
Post Concussive Syndrome (PCS)
Mild Traumatic Brain Injury (MTBI)

*Levels 4-6 Mid* (Inpatient, SNF, Outpatient, Home health):
Developing awareness

*Levels 1-3 Low* (Inpatient, SNF, Post-acute rehab):
Posttraumatic Amnesia (PTA)

Problems not addressed in this approach
Coma, Agitation, Sensory Stimulation, Dementia, Alzheimer’s
‘Playing Defense” in Dementia

Stop from managing finances
  Stop from managing meds
  Stop from driving
  Stop from shopping
  Stop from wandering
  Stop from cooking
  Prevent falls while walking
  Prevent in falls in shower
  Prevent falls while toileting
  Prevent falls getting out of chair
  Prevent falls getting out of bed
  Maintain ROM
  Maintain upright posture
  Prevent skin tears
  Prevent skin breakdown
  Prevent contractures
  Prevent problems in swallowing

Occupation Based Cognitive Rehab 2018   Rob Koch OTR/L   www.functionaltherapyactivities.com
Main Approaches to Cognitive Rehabilitation

**Remediation**

- Focus is on *restoring* the deficits in primary brain processes or cognitive sub-skills
- Typically this is carried out by targeting primary cognitive skills in isolation.

**Compensation**

- Use when cognitive remediation is not working
- Implement alternative techniques to complete tasks and activities efficiently and successfully
Traditional Cognitive Rehabilitation Sessions

Common methods to remediate cognitive deficits include:

- Drill and practice activities with pencil/paper
- Computer training activities
- Workbook activities and word problems
- Memory games
- Visual perceptual activities
- Board games
Traditional Cognitive Rehabilitation Sessions

Remediation (focusing on specific cognitive subskills) is often appropriate for persons with:

- Mild brain injury (MTBI)
- Post-concussive syndrome (PCS)
- Post traumatic stress disorder (PTSD)
- Reading problems
- Calculation problems
- Office workers
- Students
Compensating for Cognitive Deficits

The other key approach in cognitive rehab is:

**Compensation**

This approach proposes that the person with cognitive deficits use **external devices** or **mental “strategies”** to help make up for his deficits – often because remediation isn't working.
Compensating for Cognitive Deficits

Common methods to compensate for cognitive deficits include:

• **“Cognitive Prosthetics”:** phones, planners, calendars, notebooks for memory and organization deficits, alarms, electronic devices, timers
• **Strategies: Mental Procedures** to compensate for memory, attention, orientation
• **Pragmatics** for communicating in the world
• **Structuring the environment** to increase safety and efficiency for those who can’t remember or retrieve strategies as noted above
Compensating for Cognitive Deficits

Compensation approaches are often necessary for:

- Persons with severe physical problems
- Persons who live alone – but still need help
- Low functioning persons
- Persons with visual deficits
- Persons with reading problems
- Persons who are not changing despite therapy
Cognitive Prosthetics Resources

GPS

“The Cloud”: Remember the Milk.com, etc.

Voice Recognition Technology (Amazon Echo, Siri, etc.)

Augmentative Alternative Communication Devices (AAC): Ablenet, Attainment, Enabling Devices, etc.

Cell phones/Smart phones
Problems with emphasizing deficits in subskills:

• Does targeted focus on specific deficits ignore the overall picture?
• Do we know what the person was like before?
• Does an official “score” mean the person is stuck at that level of functioning?
• Did the person have a “bad” day when tested?
• Do neuro-psychological tests have “ecological validity”?
Problems with emphasizing deficits in subskills:

More questions concerning remediation methods:

- Does improvement in cognitive sub-skills actually carry over (transfer) to functional performance?
- Are pencil/paper tasks relevant to problem solving in daily activities?
- Do “simulation” scenarios on paper or virtual reality equate to “real-life” activity?
Problems with emphasizing deficits in subskills:

“In spite of the impact of goal neglect on patients’ day-to-day lives, there are few theoretically grounded, experimentally validated rehabilitation protocols for this problem.

This is attributable to a focus on behavioral deficits that are quantified in the laboratory (e.g., performance on tests of memory and attention), whereas goal neglect occurs in naturalistic situations in which behavior is not constrained by environmental structure or overlearned habits.”

(Levine, et al)(2000)
Problems in Compensating for Cognitive Deficits

Questions concerning compensation methods:

• Use of planners, calendars – often the person does not much to plan for – not as active as before
• Not enough practice using external aids during therapy sessions (schedules, pdas, checklists)
• Memory notebooks – how often do persons get asked for info in the notebook during the day?
• Memory notebooks – how often does the person need to refer to it?
Problems in Compensating for Cognitive Deficits

More concerns about compensation techniques:

• How do you apply strategies learned on pencil and paper tasks to real world situations?
• Does practicing pragmatics in controlled environments carry over outside the clinic?
• Why don't strategies taught in therapy generalize to real-life environments?
• How does one integrate alarms/timers in real-life?