Behavioral - Learning Objectives

1. Identify the different components of attention
2. Discuss evidenced based options for treating impairments in attention
3. Describe techniques for improving attention and the steps involved in carrying out treatments
4. List key factors to consider when selecting among attention treatments, developing treatment plans and setting goals
5. Write specific short-term tactical goals for rehabilitation of attention deficits that are clearly linked to long-term strategic goals and the ACRM evidence-based recommendations.
The Attention System of the Brain

<table>
<thead>
<tr>
<th>ATTENTION NETWORK</th>
<th>BRAIN REGIONS INVOLVED</th>
<th>ATTENTION SUBTYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orienting</td>
<td>Brainstem (esp. midbrain and thalamus); limbic system; frontal lobes, right parietal lobe</td>
<td>Focused and Selective</td>
</tr>
<tr>
<td>Alerting</td>
<td>RAS (esp. midbrain &amp; thalamus); right cerebral hemisphere (esp. frontal and parietal lobe)</td>
<td>Focused and Sustained</td>
</tr>
<tr>
<td>Executive</td>
<td>Frontal lobes and the structures upon which they depend on for input (BG, thalamus, limbic system)</td>
<td>High level Sustained; Selective, Alternating and Divided</td>
</tr>
</tbody>
</table>

BI-ISIG Recommendations for the Treatment of Attention Impairments

Practice Standard
- Remediation of attention during post-acute rehabilitation after TBI.
- Remediation of attention deficits after TBI should include:

Practice Option:
- Computer-based interventions may be considered as an ADJUNCT to clinician-guided treatment for the remediation of attention deficits after traumatic brain injury or stroke
  - Sole reliance on repeated exposure and practice on computer-based tasks without some involvement and intervention by a therapist is NOT recommended.
Direct Attention Training:

Attention Process Training (APT)

Attention Process Training (APT): Assessment

GOALS
- Assessment of the problem
- Identify specific type of attention impairment
- Identify tasks for generalization

TOOLS
- Attention Process Training Test
- APT-II Attention Questionnaire
- Attention Log

APT – Stages of Treatment

Acquisition → Application → Adaptation

APT – Generalization Activities

Example: Alternating Attention

<table>
<thead>
<tr>
<th>Naturalistic Setting</th>
<th>Functional Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>Cooking while monitoring the washer/dryer cycles</td>
</tr>
<tr>
<td>Vocational</td>
<td>Switching between phone and typing task</td>
</tr>
<tr>
<td>Community</td>
<td>Transportation: walking while consulting map</td>
</tr>
</tbody>
</table>

Strategy (Metacognitive) Training:

Time Pressure Management (TPM) Training
**Foundation for TPM Training**

- Helps patients learn to compensate for mental slowness
- Patients are taught to apply a structured problem-solving strategy to assist them in regulating information input
- Training can be applied to the treatment of attention, memory, problem solving, and apraxia
- Includes strategies to both prevent and manage time pressure

---

**TPM Training – Levels of Decision Making**

<table>
<thead>
<tr>
<th>Decision Making Level</th>
<th>What's involved at this level of Decision Making</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic</td>
<td>Planning and organizing step-by-step procedures <em>before task activity</em>; Developing an emergency plan</td>
</tr>
<tr>
<td>Tactical</td>
<td>Making decisions <em>while performing the task</em> to reduce or prevent subsequent problems</td>
</tr>
<tr>
<td>Operational</td>
<td>Managing stress <em>when facing problems in the moment</em> using techniques; using emergency plan</td>
</tr>
</tbody>
</table>

---

**TPM – Stages of Treatment**

- Identify the Problem
- Teach the Strategy
- Generalization

---

**TPM Stages – Identify the Problem**

<table>
<thead>
<tr>
<th>COMPONENTS</th>
<th>TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnosis of mental slowness</td>
<td>Neuropsychological testing, Mental Slowness Observation Test</td>
</tr>
<tr>
<td>Patient accepting the problem</td>
<td>Mental Slowness Questionnaire, Practice, feedback, demonstration, explanation</td>
</tr>
</tbody>
</table>

- **Prerequisites:** Awareness of therapist, Awareness of patient

---

**TPM Stages – Teaching the Strategy**

<table>
<thead>
<tr>
<th>COMPONENTS</th>
<th>TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness of the problem</td>
<td>Analyze the task for time pressure</td>
</tr>
<tr>
<td>Anticipation and Planning</td>
<td>Strategic and Tactical Planning, Emergency plan</td>
</tr>
<tr>
<td>Execution and Self-Monitoring</td>
<td>Carry out plan using strategy</td>
</tr>
<tr>
<td>Self-evaluation</td>
<td>Feedback &amp; distributed practice</td>
</tr>
</tbody>
</table>

- **Prerequisites:** Anticipatory and self-awareness, planning skills, divergent thinking skills, memory, self-monitoring & ability to use meta-cognitive strategies
TPM Stages – Generalization

<table>
<thead>
<tr>
<th>COMPONENTS</th>
<th>TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apply the strategy in new and more difficult situations</td>
<td>Practice, Feedback, Demonstration</td>
</tr>
</tbody>
</table>

**Prerequisites:** Awareness (anticipatory, emergent, self), understanding that the strategy can be generalized, reasoning skills, sufficient cognitive & learning ability, memory.

Strategy (Metacognitive) Training:

Working Memory Strategy Training

Clinical Assumptions of Working Memory Rehabilitation

Cicerone (2002)

- 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.

Rehabilitation of Working Memory:

**General N-Back Procedures**

Consists of the presentation of a random sequence of stimuli.

The patient is required to continuously report the stimulus occurring n number of stimuli previously.

Current procedure uses a deck of playing cards as stimuli.

3 Levels of Working Memory Training

- **Level 1:** Basic 1 & 2 back procedures, manipulations, card sorting task.
- **Level 2:** N-back with additional working memory demands.
- **Level 3:** N-back with continuous secondary task.

Level 1: N-Back Procedures:

![Card deck example](image)
Level 1: *N-Back* Procedures

![Card Image]

**Working Memory Training: Strategies**
- Verbal Mediation
- Managing emotional reactions
- Rehearsal
- Self-monitoring
- Self-pacing
- Sharing attentional resources

**Working Memory Training: Stages of Treatment**
- Identify the problem
- Teach the strategy
- Generalization

**Rehabilitation of Attention: Clinical Application**
**Factors to consider when selecting treatments:**
- Severity of injury
- Nature of attention impairment
- Client’s subjective complaints
- Goal of treatment

**Rehabilitation of Attention: Clinical Application**
**Factors to consider for treatment planning:**
- Location of injury
- Presence of coinciding impairments in memory or executive functioning
- Client’s goals, previous life roles and responsibilities
- Performance on baseline measures

**Rehabilitation of Attention—Tracking Progress**
**Factors to consider for goal setting:**
- Type of task
  - APT, TPM, N-Back
  - Material content (verbal – nonverbal)
  - Mode of delivery (auditory – visual)
- Task complexity
  - Density of material (letter/paragraph; pace)
  - Length of task
- Level of cueing
- Type of strategy
- Measure of success
## Rehabilitation of Attention: Clinical Application

**General guidelines for treatment**

- Treatment starts with relatively easy tasks
- Treatments are individually tailored
- Emphasis on feedback and discussion
- Distributed practice paradigm
- Be Flexible!

## Bringing it Together - Sample goals for APT

<table>
<thead>
<tr>
<th>Long Term Goal</th>
<th>Monthly Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. JK will improve his sustained, selective, and divided attention skills to increase his safety and to facilitate optimal performance on cognitive and functional tasks.</td>
<td>Initiate/Continue the acquisition stage of Attention Process Training.</td>
</tr>
<tr>
<td>- Short-term goal: Mr. JK will perform large shape cancellation tasks with moderate verbal cueing and 75% accuracy.</td>
<td></td>
</tr>
<tr>
<td>Mr. JK will perform small shape cancellation tasks with distractor overlay with 100% accuracy, intermittent verbal cues and time decremented by 25% of baseline</td>
<td></td>
</tr>
</tbody>
</table>

## Bringing it Together - Sample goals for TPM Training

<table>
<thead>
<tr>
<th>Long Term Goal</th>
<th>Monthly Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ms. XX will consistently implement time pressure management strategies in the home environment for complex, multi-step task completion.</td>
<td>Initiate/Continue the acquisition stage of time pressure management training strategy.</td>
</tr>
<tr>
<td>- Short-term goal: Following clinician review and moderate verbal cueing, Ms. XX will initiate the four steps for managing complex situations.</td>
<td></td>
</tr>
<tr>
<td>Ms. XX will generate the components of all 2 levels (strategic, tactical, operational) of a TPM plan for going to the movies with minimum clinician assistance.</td>
<td></td>
</tr>
<tr>
<td>Ms. XX will appropriately apply the steps of the TPM plan in 80% of opportunities with minimum verbal cueing to self-monitor performance.</td>
<td></td>
</tr>
</tbody>
</table>

## Bringing it Together - Sample goals for Working Memory

<table>
<thead>
<tr>
<th>Long Term Goal</th>
<th>Monthly Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. XY will effectively use working memory strategies to improve his complex attention and facilitate increased functional independence on home and work related tasks.</td>
<td>Initiate/Continue the acquisition stage of working memory strategy training.</td>
</tr>
<tr>
<td>- Short-term goal: Following clinician demonstration and practice Pt will perform basic 1-back procedure with 70% accuracy and max cues to use verbal mediation strategies.</td>
<td></td>
</tr>
<tr>
<td>Pt will perform the 3-back with random generation task in less than 7 minutes, with 75% accuracy and moderate cueing to use verbal mediation strategies.</td>
<td></td>
</tr>
<tr>
<td>Perform 2-back task while following along with audiorecorded conversations in less than 5 minutes and with 90% accuracy.</td>
<td></td>
</tr>
</tbody>
</table>

---

**ACRM**

AMERICAN CONGRESS OF REHABILITATION MEDICINE

Improving lives through interdisciplinary rehabilitation research

[www.ACRM.org](http://www.ACRM.org)