Maximizing Home Exercise Program Completion for Adults with Acquired Cognitive Impairments

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What is the evidence for intensive treatment programs?
- Identify 3 evidence-based intensive interventions that are effective for survivors of ABI

How can we maximize intensive treatment delivery using home programs?
- List 5 factors that influence home program compliance

What are the assistive technologies that can improve home program compliance?
- Describe the benefits of assistive technologies to prompt home program completion for adults with acquired cognitive impairments

The Evidence for Intensive Treatment Programs

Across rehabilitation domains, evidence supports intensive treatment to improve functional outcomes:
- Physical Exercises
  - Constraint-Induced Movement Therapy (Taub et al., 1993)
- Speech-Language Pathology:
  - Aphasia Rehabilitation (e.g., Robey, 1998)
  - Dysphagia Exercises (e.g., Shaker et al., 2002)
  - Motor Speech Treatment (e.g., Ramig et al., 2001)
  - Cognitive Rehabilitation (e.g., Sohlberg & Mateer, 2001)

Intensity is Key
**Why Intensive Practice?**

- Principle of neuroplasticity
  - intensive, repetitive stimulation leads to behavior effects AND neural changes in animals and humans (Mark, Taub, & Morris, 2006)
- Learning & memory systems
  - Distributed practice with repeated stimulation improves recall (Baddeley, 1999)
  - Even individuals with acquired cognitive impairments can learn new info:
    - Spaced Retrieval for fact learning (Brush & Camp, 1998)
    - TEACH-M for procedural learning (Ehlhardt et al., 2005)
- More “bang for the buck”
  - improved outcomes in shorter durations

**How to Achieve Intensity**

- General Ideas:
  - Overload Principle: stimulate beyond usual workload
  - distribute sessions (not massed practice)
  - allow rest breaks between sessions
  - Gradually increase task demands (e.g., resistance, complexity)
  - Gradually increase number of repetitions
  - Home programs…

  [Burkhead, Sapienza, & Rosenbek, 2007; Clark, 2003]

**Factors that Influence Home Program Compliance**

- For Physical Exercise Programs…
- Over 200 variables identified across studies (Meichenbaum & Turk, 1987)
- From literature on:
  - Healthy Adults (Dzewaltowski, 1994; King, 1994; Robison & Rogers, 1994)
  - Elderly Adults (Dishman, 1994; Henry et al., 1998)
  - PT (Campbell et al., 2001; Friedrich et al., 1998)
  - OT (Chen et al., 1999)
  - SLP: Swallowing (Easterling et al., 2005)
- Major Findings:
  - Programs only effective when completed regularly (e.g., Chen et al., 1999; Fatouros et al., 2005; Kirwan et al., 2002; Logemann, 2005; Robison & Rogers, 1994)
  - Less than 50% of patients complete home programs (Chen et al., 1999; Sluijs & Knibbe, 1991)
In General:
- Difficulty of task (e.g., Easterling et al., 2005)
- Structure of program (e.g., Easterling et al., 2005)

For Adults with Acquired Cognitive Impairments:
- Reliance on others for assistance/prompts (Robbins & Kays, personal communication)
- Difficulty initiating tasks, recalling tasks, or completing tasks correctly (Sohilberg & Mateer, 2001)

Personal Motivation
- Demonstrate a clear relation to functional outcomes
- Foster self-efficacy and internal locus of control over outcomes
- Frequent reminders of goals & evidence to support outcomes
- Engage learners with age-appropriate tasks & tools
- Foster early success & positive attitudes

Maximize Environment for Compliance:
- Provide means of support & encouragement
  - Enlist care providers & client groups for social motivation
  - Engage clients with ongoing, dynamic feedback on performance
- Ensure clear instructions & correct practice
- Provide motivating, multi-media instructions
- Match schedule to client’s schedule and needs
- Provide means for accountability & regular check-ins
  - Foster relationship of trust between client & clinician
  - Provide evidence-based treatments
- Maximize benefit:cost ratio for both client & clinician
- Develop procedures for ongoing re-assessment & program modifications
  - Step-Up difficulty (e.g., reduce supports, increase task level)
  - Step-Down difficulty (e.g., reduce intensity, reduce criterion)
Assistive Technologies to Improve Home Program Compliance

Assistive Technology for Cognition (ATC) Options (LoPresti et al., 2004; Scherer et al., 2005)
- Technical complexity (simple ↔ complex)
- Design (commercial ↔ specialized)
- Functionality (single-purpose ↔ multi-functional)
- Examples: PDA, pagers, cell phones, voice organizers...
- Evidence: Effective to prompt behavior initiation & completion (Sohlberg et al., 2007; Wilson et al., 2001)

Telederehabilitation Options (ASHA, 2005)
- Motiva TV home prompting system (www.medical.phillips.com)

Assistive Technologies: Options for Prompting Home Exercises

A Novel Approach: TAP

- Television Assisted Prompting (TAP) System
  - Delivers evidence-based exercises to patients who could benefit from intensive home practice
  - Incorporate strategies to maximize program completion
  - Encourages self-efficacy & internal locus of control
  - Establishes relaxed, upbeat environment
  - Includes social supports & reinforcers
  - Provides clear instructions with dynamic, multi-modal information
  - Monitors adherence & provides regular feedback
- Incorporate strategies to maximize effective use of assistive technology for users with cognitive impairments
  - Follows Universal Design principles (www.universaldesign.org)
  - Follows ATC best practices (LoPresti et al., 2004; Scherer et al., 2005)
### Study Results: Efficacy - Jonas

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### Study Results: Efficacy - Gerald

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### Study Results: Efficacy - Timothy

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### The TAP System: Hardware
Take-Home Message

**Add to your “Bag o’ Tricks”**

- Know the evidence to support (or refute) your treatments
- Is intensity a key factor for successful outcomes?
- Would a home program be a useful method to increase intensity?

**Home Program Planning**

- Plan for ongoing monitoring & modification of home programs
- Enlist strategies to maximize compliance

- Consider Assistive Technologies for home prompting
  - Important to match client’s goals and experiences to technology
  - Important to train clients to use technology

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**Selected References**


