
Mental Practice in Stroke Rehabilitation

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Background - Mental Practice

- Cognitive rehearsal of activities
 - Used for decades to improve athletic performance
 - Same parts of brain activated when imagining an activity as when performing it
 - Growing body of literature regarding the benefit of MP for stroke patients
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Research Question

- Is mental practice effective to improve upper extremity function post-stroke?
 - Who would benefit most and what dosage and frequency should be used?
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Methods

Databases searched:

- CINAHL
- PsychInfo
- PubMed
- Cochrane Library
- ScienceDirect

Search terms:

- guided imagery
- mental imagery
- mental practice
- motor imagery
- upper extremity
- stroke

Terms defined

- **Mental practice + motor imagery** = visualize oneself performing task or imagine sensations associated with task
 - **Guided imagery** - relaxation, stress reduction, pain management
 - **Visual imagery** - similar to guided imagery, can include the use of pictures
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Methods

Inclusion criteria:

- Upper extremity function as primary outcome
- Acute or chronic post-stroke participants
- Valid and reliable assessment tools
- Published within past ten years
- Priority given to RCT's

Exclusion criteria:

- Not from academic or peer-reviewed journal
- LE function primary outcome
- Sports related
- No English translation

Methods

Search yielded 167 studies

12 studies included in final review

- 8 RCTs
 - 1 Quasi-experimental design
 - 1 SSD
 - 2 Systematic reviews
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Population

- 75% men, 25% women
 - Ages 27-81, most in early to mid 60s
 - Acute and chronic stroke (7 days to 4 years)
 - Left or right hemiparesis
 - Mild to moderate impairments
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Outcomes

- Effectiveness determined by increase in upper extremity function:
 - Motricity Index, Arm Functional Test, Barthel Index, Fugl-Meyer Assessment, grip strength, pegboard and Action Reach Arm Test
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Additional Outcomes

- Performance on functional tasks
 - Compliance
 - Ability to perform MP
 - Kinesthetic and Visual Imagery Questionnaire (KVIQ)
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Intervention - Setting

- Home
 - Outpatient
 - Inpatient
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Intervention - Types

- Varied!
- Different modes of delivery as well as tasks
- Audiotape for MP*
- Use of pictures to imagine steps of task
- Therapist-led MP with homework*

*Consider the extent of therapist involvement

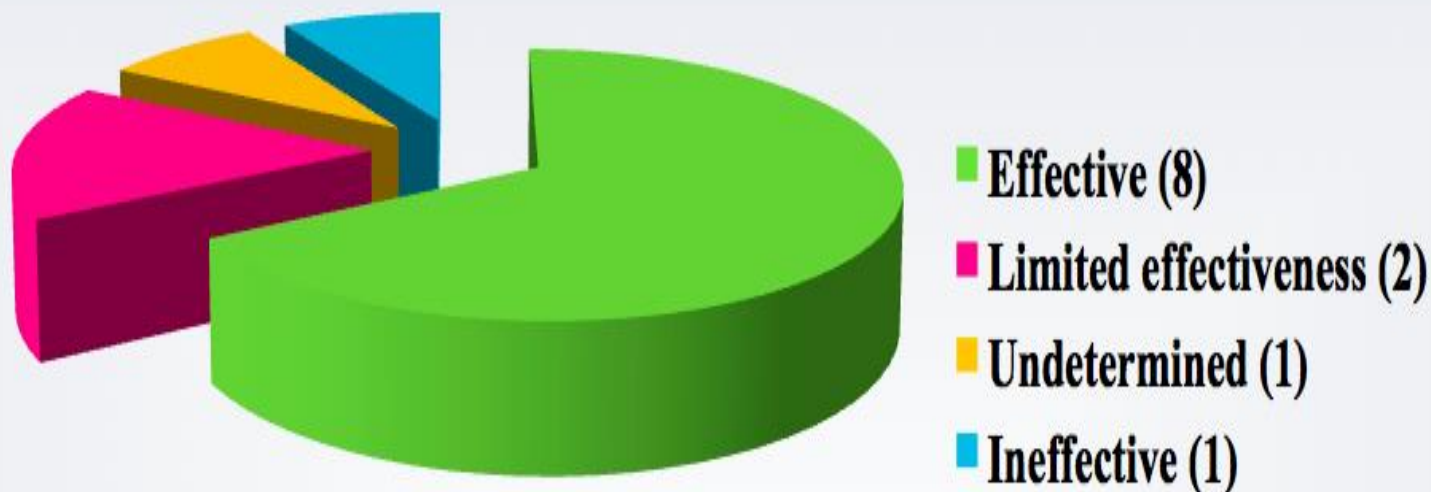
Intervention - Dosage

- Ranged from 20-60 minutes
 - 2x/week to 5x/week
 - 2 weeks to 10 weeks in duration
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Results

- 7 studies found that mental imagery in combination with motor practice more effective than motor practice alone
 - 1 study found that mental practice is more effective than no intervention
 - 2 systematic reviews concluded there is limited evidence to support mental practice
 - 1 study had low patient and therapist compliance, so results were undetermined
 - 1 study found that mental practice alone does not improve upper extremity function compared to traditional rehab
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Results of 12 mental practice interventions for improving upper extremity motor function



Limitations

- Publication bias
 - Excluded studies not translated into English
 - Researcher bias - did not independently review all articles
 - Time constraints
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Conclusion from Literature Review

- Limited evidence of small to moderate benefit of mental practice in combination with traditional OT or PT
 - Safe, cost effective, provides many opportunities for practice
 - Ability to perform MP should be assessed
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New Research

- Moderate evidence for use of MP with Parkinson's patients as well as CVA (Braun et al., 2013)
 - Task-oriented MP found to be effective in improving grasp and general hand function; used TOA principles (Santos-Couto-Paz, Teixeira-Salmela & Tierra-Criollo, 2013)
 - Introductory MP program developed: improved patient knowledge of MP but not patient self-confidence in using MP (Wondrusch & Schuster-Amft, 2013)
 - MP can be used for preparatory activities and increases the efficiency of physical practice (Malouin, Jackson & Richards, 2013)
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Clinical Application

3 step framework for use in practice:

- Introduce MP - give MP in separate mode of administration (such as audiotape) for 1 or 2 tasks outside of therapy
- Combine MP at home with physical practice during therapy- start with small number of mental repetitions, simple tasks and build to more complex ones
 - gauge repetitions and intensity accordingly
- Client engage in self-practice - increase use of MP in stimulating way outside therapy, such as apps for tablets

(Malouin, Jackson & Richards, 2013)

Recommended Procedure

1. Assess client's ability to perform MP (consider KVIQ)
 2. Explain what MP is and why it is effective
 3. Choose meaningful task that the client is already working on in therapy
 4. Do a MP session (less than 30 minutes) in therapy
 5. Create an audio recording for client to use outside therapy
 6. Provide refresher trainings
 7. Upgrade MP task to increase difficulty as client progresses
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Clinical Bottom Line

- MP is effective adjunct for adults with acute or chronic stroke
 - Should accompany OT or PT treatment
 - No harmful effects
 - Sessions should last less than 30 minutes
 - Tasks should be relevant to therapy goals
 - Training and follow up is important
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Future Research

- Page currently conducting a multicenter RCT that examines the efficacy of mental practice combined with RTP (repetitive task-specific practice)
 - More high quality RCTs of large sample sizes needed
 - Compare dosage and protocols for MP
 - Possibly create standardized protocol
 - What point in rehabilitation should MP be used
 - What adjunctive therapies maximize MP effectiveness
 - Which clients benefit most
 - Better understand role of MP in neural recovery
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Background - Stroke

Stroke is the leading cause of serious long-term disability, costing Americans \$38.6 billion annually

CDC, 2013
