



AOTA Critically Appraised Papers Series

Evidence Exchange

**A product of the American Occupational Therapy Association's Evidence-Based Literature Review Project*

CRITICALLY APPRAISED PAPER (CAP)

FOCUSED QUESTION

Is mirror therapy an effective intervention for improving function in paralyzed upper extremities after a stroke as compared to the standard therapy?

Dohle, C., Püllen, J., Nakaten, A., Küst, J., Rietz, C., & Karbe, H. (2008). Mirror therapy promotes recovery from severe hemiparesis: A randomized controlled trial. *Neurorehabilitation and Neural Repair*, 23(3), 1–9. <http://dx.doi.org/10.1177/1545968308324786>

CLINICAL BOTTOM LINE:

While this study did not show statistically significant improvements in motor functioning for individuals engaging in mirror therapy after their first stroke, it did show statistically significant improvements in neglect and light-touch scores as compared to the control therapy group. This study did not address whether these improvements were clinically important. Improvements in motor functioning for the mirror therapy group over the control therapy group were present; however, they did not reach statistically significant effects. A larger research group might help to show more favorable results. A definitive protocol for mirror therapy still needs to be established to provide the best results when this therapy is used with post-stroke patients.

RESEARCH OBJECTIVE(S)

List study objectives.

To determine whether viewing the unaffected upper extremity in a mirror while performing movements encourages recovery of the affected limb in individuals with severe hemiparesis.

DESIGN TYPE AND LEVEL OF EVIDENCE:

Randomized control trial, Level I

Limitations (appropriateness of study design):

Was the study design type appropriate for the knowledge level about this topic? *Circle yes or no, and if no, explain.*

YES NO

SAMPLE SELECTION

How were subjects selected to participate? Please describe.

Subjects were recruited as they were admitted to “Godeshöhe Rehabilitation Center between October 2004 and April 2006,” (p. 2) after incurring severe hemiparesis after their first stroke.

Inclusion Criteria

Stroke occurring in the middle cerebral artery within 8 weeks of study beginning; ages 25 and 80; ability to comply with instructions; physically able to participate in 30 minutes of therapy daily.

Exclusion Criteria

“previous strokes, major hemorrhagic changes, increased intracranial pressure, hemispherectomy or orthopedic, rheumatologic, or other diseases interfering with their ability to sit or to move either upper limb” (p. 2).

SAMPLE CHARACTERISTICS

N = 36

% Dropouts

#/ (%) Male

#/ (%) Female

Ethnicity

Disease/disability diagnosis

Check appropriate group:

<20/study group	20–50/study group	51–100/study group	101–149/study group	150–200/study group
✓				

INTERVENTION(S) AND CONTROL GROUPS

Add groups if necessary

Group 1

Brief Description	Mirror Therapy--A therapy protocol designed for the study was used that consisted of verbal instructions to move the arm, hand, and fingers while looking in the mirror at the unaffected arm as if it were the affected arm. Mirror therapy occurred in addition to standard therapy.
Setting	Inpatient Rehabilitation Center.
Who Delivered?	Study authors--Qualifications not specified.
Frequency?	5 days a week for 6 weeks.
Duration?	30 minutes per treatment session (in addition to standard therapy).

Group 2

Brief Description	Control Therapy--Same motor tasks as mirror therapy group but without mirror. Control therapy occurred in addition to standard therapy.
Setting	Inpatient Rehabilitation Center.
Who Delivered?	Study authors--Qualifications not specified.
Frequency?	5 days a week for 6 weeks.
Duration?	30 minutes per treatment session (in addition to standard therapy).

Intervention Biases: Circle yes or no and explain, if needed.

Contamination

YES/NO

There is no evidence that contamination occurred.

Co-intervention

YES/NO

Patients in both groups were allowed to receive any other therapy necessary at the hospital while in the study, including occupational therapy, physiotherapy, antidepressant medication, and activities of daily living training. Data shows that both groups received about the same amount of each standard therapy.

Timing

YES/NO

The study was a reasonably short length of 6 weeks, and while some natural improvement likely also occurred, both groups were submitted to it equally.

Site

YES/NO

All clients received therapy at the inpatient rehabilitation center.

Use of different therapists to provide intervention

YES/NO

Two therapists were involved in the experimental intervention, but it is not clear if they were each assigned to one group or if they spent an equal amount of time with each group. However, a standardized therapy protocol was used by both therapists.

MEASURES AND OUTCOMES

Complete for each relevant measure when answering the evidence-based question:

Name of measure, what outcome was measured, whether the measure is reliable and valid (as reported in article--yes/no/NR [not reported]), and how frequently the measure was used.

Fugl-Meyer upper-extremity test (motor functions of fingers, hands, and proximal arm and non-motor functions of touch, proprioception, range of motion, and pain). Reliability and validity were not reported in the article, measured with test before and after study intervention.

Name of measure, what outcome was measured, whether the measure is reliable and valid (as reported in article--yes/no/NR [not reported]), and how frequently the measure was used.

Action Research Arm test (grasp, grip, pinch, and gross movement). Reliability and validity were not reported in the article, measured with test before and after study intervention.

Name of measure, what outcome was measured, whether the measure is reliable and valid (as reported in article--yes/no/NR [not reported]), and how frequently the measure was used.

Functional Independence Measure (The FIM™) Motor Portion (self-care and mobility assessment). Reliability and validity were not reported in the article, measured with test before and after study intervention.

Measurement Biases

Were the evaluators blind to treatment status? *Circle yes or no, and if no, explain.*

YES NO

The study states that the evaluators of the motor FIM and neuropsychological testing were blinded. It appears that the evaluators of the Fugl–Meyer test and the Action Research Arm test were also blinded; however, this is not clearly stated in the study.

Recall or memory bias. *Circle yes or no, and if yes, explain.*

YES NO

Others (list and explain):

N/A

RESULTS

List results of outcomes relevant to answering the focused question

Include statistical significance where appropriate ($p < 0.05$)

Include effect size if reported

- No statistically significant differences on Fugl–Meyer test. Improvements favored the mirror treatment group but were not statistically significant.
- On the Action Research Arm Test, 1 out of 12 patients made functional improvements in the control group, as opposed to 4 out of 13 in the mirror therapy group; however, statistical significance is not reported.
- Light-touch improvements were statistically significantly different, favoring the mirror therapy group over the control therapy group ($p = 0.009$ and effect size [epsilon] = 0.57).
- Range-of-motion and pain measures showed no therapeutic changes.
- Neglect score significantly improved in the mirror therapy group over the control therapy group ($p = 0.005$, effect size [epsilon] = 0.99).
- No difference in ADL scores as measured by The FIM between therapy groups.

Was this study adequately powered (large enough to show a difference)? *Circle yes or no, and if no, explain.*

YES NO

According to a priori power calculation.

Were appropriate analytic methods used? *Circle yes or no, and if no, explain.*

YES NO

Were statistics appropriately reported (in written or table format)? *Circle yes or no, and if no, explain.*

YES NO

Clearer reporting of statistical significances and effect sizes in table format would have been helpful, as it was sometimes confusing to which outcomes the significance scores and effect sizes were referring in the written format.

CONCLUSIONS

State the authors' conclusions that are applicable to answering the evidence-based question.

- Mirror therapy is more effective for regaining distal-limb function than proximal-limb function.
- Sensory improvements shown in this study helps to prove that vision and touch are closely related, and watching the healthy limb in a mirror can “lead to a referral of sensation to the other hand” (p. 6). Future studies should look more closely at changes in sensation caused by mirror therapy.
- No statistically significant differences were observed between groups on the Fugl–Meyer test, in FIM scores, in range of motion, or in pain.
- This study showed no relationships between improvement and whether the lesion was on the left vs. right side, on the dominant vs. non-dominant side, or in the cortical vs. subcortical area.
- Mirror therapy has a positive effect on reducing hemi-neglect.
- A definitive protocol for mirror therapy has yet to be established that provides the most favorable results.

This work is based on the evidence-based literature review completed by Elizabeth Sikorski, MOTS.

CAP Worksheet adapted from Critical Review Form-- Quantitative Studies. Copyright © 1998, L. Law, D. Stewart, N. Pollack, L. Letts, J. Bosch, & M. Westmorland, McMaster University. Used with permission.

For personal or educational use only. All other uses require permission from AOTA. Contact:

www.copyright.com



Copyright © 2013 American Occupational Therapy Association, Inc. All rights reserved.
For personal or educational use only. All other uses require permission from AOTA.
Contact: copyright@aota.org