FOCUSED QUESTION
How does adding mirror therapy (MT) to conventional therapy (CT) affect motor recovery of the upper extremity for patients after a subacute stroke as compared to CT alone?


CLINICAL BOTTOM LINE:
This study showed statistically significant improvements in upper extremity (UE) motor function and functional independence for the exposure group. In addition to being statistically significant, improvements seen in the MT exposure group were shown to be clinically meaningful because they exceeded the MCID (minimal clinically important difference). The limitations of this study include a lack of follow-up, which would reveal whether or not the treatment has long-term effects, a small sample size, and whether there was evaluation of modifications in participation or quality of life. The intervention used in this study was well described and replicable.

RESEARCH OBJECTIVE(S)
List study objectives.

The objective of the study was to determine whether mirror therapy (having patients observe the reflection of their unaffected limb during bilateral UE movements) in addition to conventional therapy would improve motor functioning of the affected limb in patients poststroke with moderate to severe hemiparesis.

DESIGN TYPE AND LEVEL OF EVIDENCE:
Level I: Randomized controlled trial

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.
SAMPLE SELECTION
How were subjects selected to participate? Please describe.

Participants were taken from among those referred to a “Physical and Rehabilitation Medicine Unit between October 2009 and August 2011” (p. 312) after having a stroke resulting in UE hemiparesis. Participants were randomly placed in either the mirror therapy or the control therapy group.

Inclusion Criteria

Participants had to (1) experience hemiplegia after one’s first stroke that has been documented by either a CT scan or one’s case history; (2) have had the stroke fewer than 4 weeks ago; (3) have no severe attentive/cognitive deficits; and (4) have a Motricity Index score of less than 77 for UE, indicating the presence of movements at the three main sites of the upper limb (shoulder, elbow, and hand).

Exclusion Criteria

The exclusion criteria were “1) hemorrhagic stroke diagnosis; 2) global aphasia and cognitive impairments that might interfere with understanding instructions for testing, and treatment and/or Mini-Mental State Examination Test < 22/30; 3) concomitant progressive central nervous system (CNS) disorders, peripheral nervous system disorders or myopathies” (p. 312).

SAMPLE CHARACTERISTICS

N = 26

% Dropouts 4.0%

#/ (%) Male 17/(65.4%)

#/ (%) Female 9/(34.6%)

Ethnicity NR

Disease/disability diagnosis Moderate to severe upper extremity hemiparesis secondary to subacute stroke.

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 (MT) in addition to conventional treatment (CT): The CT consisted of occupational therapy, electrical stimulation, and neuro-rehabilitative techniques. MT was conducted “seated on a chair, with the mirror board (65 x 45 cm) positioned between the upper limbs
perpendicular to the subject’s midline and with the unaffected upper limb facing the reflective surface. Under the supervision of the physiotherapist, the patients observed the reflection of their unaffected upper limb while performing the following movements: flexion and extension of the shoulder, elbow, and wrist and prone-supination of the forearm. The speed of movements was self-selected and no additional verbal feedback was offered” (p. 312).

<table>
<thead>
<tr>
<th>Setting</th>
<th>A Physical and Rehabilitation Medicine Unit in a room separated from the other patients. Therapy was one-on-one.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who Delivered?</td>
<td>A physiotherapist blinded to assessment results</td>
</tr>
<tr>
<td>Frequency?</td>
<td>Five 1-hour sessions of CT a week with an additional 30 minutes of MT per session for the first 2 weeks, and additional 1 hour of MT per session for the last 2 weeks</td>
</tr>
<tr>
<td>Duration?</td>
<td>4 weeks</td>
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**Group 2**

<table>
<thead>
<tr>
<th>Brief Description</th>
<th>Control Therapy: The conventional treatment was administered as in the mirror therapy group, plus an additional sham therapy. The sham therapy was conducted in the same way as the mirror therapy, but with a sheet of paper covering the mirror.</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

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

**Contamination**

| YES/NO                          | There is no evidence that contamination occurred.                                                               |

**Co-intervention**

| YES/NO                          | There is no evidence that the participants were involved in any other interventions during the course of this study. |

**Timing**

| YES/NO                          | This study lacks a follow-up, which would have indicated whether or not the results of the intervention are long-lasting. |

**Site**

| YES/NO                          | All of the participants received therapy at the same Physical and Rehabilitation Medicine Unit.                |
Use of different therapists to provide intervention

| YES/NO | An unspecified number of physiotherapists provided the intervention. It is unclear whether the same physiotherapists saw both the control group and exposure groups or whether different physiotherapists oversaw each group. |

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.

| Action Research Arm Test (grasp, grip, pinch and gross arm movement): Reliability and validity were not reported in the article. Frequency of measurements was not reported. |

| Motricity Index (brief assessment of motor function during Functional Independence Measure): Reliability, validity, and frequency of the measure were not reported in this article. |

| Functional Independence Measure (FIM™): A measure of how much assistance in necessary of a person to complete activities of daily living. Reliability, validity, and frequency of the measure were not reported in this article. |

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

| YES/NO | The evaluators weren’t blind to treatment status. However, the physiotherapists administering the treatments were blinded to assessment results. |

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

| YES/NO |

Others (list and explain):

| The authors of this article imply that assessments other than the ARAT (Action Research Arm Test), such as the Fugl-Meyer Assessment or Box & Blocks, would have been equally sensitive in assessing motor recovery after stroke as well as motor function evaluation of the upper limb. |

RESULTS
List results of outcomes relevant to answering the focused question
Include statistical significance where appropriate (p < 0.05)
Include effect size if reported

- On the FIM, the MT group’s mean scores improved from 52 (plus or minus 17.16) to 93.18 (plus or minus 22.07) compared to the scores of the control therapy group, whose mean scores improved from 45.67 (plus or minus 15.79) to 67.42 (plus or minus 13.19; p < 0.05 pre-post treatment evaluation, p < 0.001 between the two groups).
- On the ARAT, the MT group’s mean scores increased from 15.90 (plus or minus 22.07) to 47.64 (plus or minus 15.19) as compared to the control group, whose mean scores increased from 21 (plus or minus 20.61) to 33.67 (plus or minus 20.33; p < 0.05 pre-post treatment evaluation, p < 0.001 between the two groups).
- On the MI, the mean scores of the MT group increased from 39.27 (plus or minus 27.33) to 76 (plus or minus 21.78) as compared to the control group, whose mean scores increased from 36.83 (plus or minus 24.34) to 51.58 (plus or minus 24.74; p < 0.05 pre-post treatment evaluation, p < 0.001 between the two groups).

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

YES/NO N/A

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

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

- There were statistically significant improvements in FIM scores for both groups after 1 month.
- There were statistically significant improvements in FIM scores for participants in the MT (exposure) group as compared to those in the CT (control) group after 1 month.
- There were statistically significant improvements in ARAT scores for participants in the MT (exposure) group as compared to those in the CT (control) group after 1 month.
- There were statistically significant improvements in MI scores for participants in the MT (exposure) group as compared to those in the CT (control) group after 1 month.
- There were clinically meaningful improvements in ARAT and FIM scores in the MT group as compared to the CT group, because they were greater than the Minimal Clinically Important Difference.
This work is based on the evidence-based literature review completed by Rebecca Brito, MOTS, and Myka Winder, OTD, OTR/L, Faculty Advisor, University of Southern California.


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