European University Cyprus

The effectiveness of Mirror Therapy combined with Conventional Rehabilitation in acute and subacute stroke individuals: A systematic review and meta-analysis of Randomized Controlled Trials

Ioanna Chari, Leda Demetriou, Dr. Pavlina Psychouli, Dr. Ioannis Mamais

Introduction

- **12.2. million** stroke cases per year, with **80%** of survivors experiencing Upper Limb (UL) motor impairments.
- Mirror Therapy (MT) may improve UL function, but evidence is conflicting.
- More evidence is needed on MT's impact on Activities of Daily Living (ADL).
- Optimal MT protocol (duration, frequency, intensity) is still unknown.

Aims

1. Assess the effectiveness of MT combined with Conventional Rehabilitation (CR) on UL motor function in acute and subacute stroke patients.
2. Evaluate the impact of MT on ADLs.
3. Identify the most effective MT protocol based on Total Treatment Time (TTT).

Methods

Four databases were searched from April 2005 to July 2025.

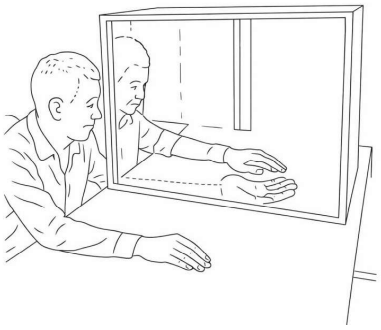
P: Adults (≥18), first stroke, in acute/subacute stroke phase, hemiplegia, no severe cognitive disorders

I: MT combined with CR

C: CR alone

O: UL motor function and ADL participation

S: Randomized Controlled Trials (RCTs)



Quality Assessment

The Risk of Bias tool was used (RoB-2).

Total Treatment Time

Low TTT	Moderate TTT	High TTT
≤7hours	7-11 hours	>11 hours

Results

Study Selection:
23 RCTs met the eligibility criteria.

Significant Findings of meta-analyses				
UL Function	**ADL Participation**	**MT Protocols**		
		Low TTT	**Moderate TTT**	**High TTT**
FMA-motor **(MD=4.23, 95% CI=1.38 to 7.09)**	FIM (self-care) **(MD=2.86, 95% CI=1.11 to 4.62)**	-	FMA-motor **(MD=3.38, 95% CI=0.12 to 6.65)**	BBT **(MD=5.97, 95% CI=0.90 to 11.05)**
FMA-shoulder **(MD=2.49, 95% CI=-0.00 to 4.99)**	-	-	-	-
BBT **(MD=4.10, 95% CI=0.70 to 7.50)**	-	-	-	-
Manual Function Test (MFT) **(MD=1.93, 95% CI=0.73 to 3.13)**	-	-	-	-

Table 1: Significant Findings.

Non-Significant Findings of meta-analyses				
UL Function	**ADL Participation**	**MT Protocols**		
		Low TTT	**Moderate TTT**	**High TTT**
Fugl-Meyer Assessment-motor-hand (FMA-hand)	Barthel Index (BI)	Fugl-Meyer Assessment-motor (FMA-motor)	-	FMA-motor
Fugl-Meyer Assessment-motor-wrist (FMA-wrist)	Modified Barthel Index (MBI)	-	Fugl-Meyer Assessment-shoulder (FMA-shoulder)	FMA-shoulder
Action Research Arm Test (ARAT)	Functional Independence Measure (FIM)	-	FMA-hand	FMA-hand
Stroke Impact Scale (SIS)	-	-	FMA-wrist	FMA-wrist
-	-	-	ARAT	ARAT
-	-	-	Box and Block Test (BBT)	-

Table 2: Non-Significant Findings.

Discussions

UL Function

Factors Associated With Improved Outcomes

Early intervention, higher baseline function, right hemisphere strokes, therapist-assisted movement, task-specific training, and electrical stimulation (ES).

Factors Associated With Poor Outcomes

Methodological Limitations of Studies
Lack of blinding, small sample sizes, and restricted range of movement in MT box.

Participant Characteristics
Inclusion of visuospatial neglect, severe and unmotivated participants.

Scoring and Assessment Limitations
ARAT scoring easily led to point loss, and analyzing FMA subcategories individually may have negatively influenced the results.

ADL Participation

Factors Associated With Improved Outcomes

Participant age, stroke severity and ES.

Factors Associated With Poor Outcomes

Methodological Limitations of Studies
Small sample sizes, and lack of blinding.

Participant Characteristics
Severe stroke individuals

- ADL training is not always included in MT sessions.
- MT combined with CR had limited impact on ADL participation.

MT Protocols

- High and Moderate TTT had better outcomes compared to Low TTT.
- Protocols with more sessions and longer session time were generally more effective. (e.g., 25 minutes, twice a day, 5 days a week, for 4 weeks)

Observed in Moderate and High Protocols
Practicing meaningful activities during MT, such as task-oriented practice combined with movement-based practice, was more effective.

Conclusions

In certain cases, MT can enhance UL function in individuals with acute and subacute stroke, particularly when protocols with Moderate and High TTT are implemented. However, the impact of MT on participation in ADL remains uncertain. Hence, further research is essential.

REFERENCE LIST