Comparison of Mirror Therapy and Motor Relearning Program in improving the lower limb motor function of patients with stroke

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ARTICLE INFORMATION

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ABSTRACT

Objective: The purpose of this research is to contrast the effects of mirror therapy & motor learning programs in ameliorating the function of the lower limb in patients with stroke.

Methods: The research was conducted in R.Y.K (Rahim Yar Khan) at Al-Jannat Medicare & Al-Noor hospital. The time duration was January-July 2020. The technique used was RCT. The data was collected after ethical approval from Isra University. The sample consisted of 30 subjects with an age range of 40 to 65 years. Group A received MRP treatment while mirror therapy was given to Group B. Modified Fugl Meyer Assessment scale was used to measure the outcomes of variables. SPSS 20 was applied to assess the research facts. Non-parametric Friedman T-Test was applied for intra-group comparison whereas inter-group comparison was checked by the Kruskal Wallis test. Three assessments were performed, pre-assessment at 0 weeks, mid-assessment at 3rd week, and post-assessment at 6th week.

Results: Out of the total 30 participants in the study, males were 21 while females were 9. Patients with left hemiplegia were 22 while 8 were with right hemiplegia. The mean age was 53.80±7.66. The results show that both treatments are effective in increasing the motor activity of patients with stroke. But motor relearning techniques are more effective as a significant difference manifested between the two treatments. (p<.005)

Conclusion: This conclusion showed that a motor relearning program is more beneficial than mirror therapy in enhancing the lower limb motor activity of patients with stroke.

Keywords: Motor control, Mirror Therapy, Motor, relearning, Stroke

Original Research Article

Introduction:
A stroke is defined as the sudden death of some of the cells of the brain because of a deficiency of O2 when an artery providing nutrition to the brain is blocked/ruptured. Hemorrhagic & Ischemic are the two major types of stroke. Ischemic type is associated with blockage of an artery while hemorrhagic stroke is associated with rupture of an artery. Generally, 80% of stroke cases are due to an ischemic stroke while 20% of cases result from hemorrhagic stroke. Signs & symptoms related to stroke include unilateral paresis & speech problems. The risk factors linked with stroke can be categorized into two groups such as modifiable & non-modifiable. The modifiable group includes hypertension, unhealthy diet, sedentary lifestyle, obesity & smoking while the non-modifiable group includes gender, age & ethnicity. Globally, CVA is the third leading source of dysfunction & the 2nd leading source of death. In Pakistan, the rate of occurrence of stroke is higher than in other developing countries. In 2013 the number of incidents and prevalence of stroke was significantly higher as compared to 1990 for women & men. In Bangladesh, the incidence of stroke was higher the male & elderly individuals. Patients with hypertension or diabetes are at greater risk of having a stroke. Different therapeutic interventions are used for the treatment of stroke such as Mirror Therapy, Motor Relearning Program, Constrained Induced Movement Therapy, and Proprioceptive Neuromuscular Facilitation. Initially, Mirror therapy was used to decrease the phantom limb’s pain after amputation. The mirror image of the sound limb gave the sensation to move both arms. Ramachandran explained the process of relearning in an unlearned brain. The motor relearning techniques were introduced by Australian physios; Janet Carr and Roberta Shepherd. The motor relearning techniques comprises 4 steps the scanning of function, execution of lost components, & sustained implementation and transference of training. It’s a goal-oriented technique that enhances function and concentrates on relearning activities. The Fugl-Meyer scale was structured as the primary quantitative instrument for the evaluation of sensory and motor recovery in stroke. Fugl Meyer’s motor domain has 100 points. It has excellent inter-rater intra-rater and constructs validity. There is a demand to integrate patient-directed, simple, easy, and productive treatment
approaches that improve function after CVA. Literature shows few studies which compare the effect of MRP & mirror therapy in patients with stroke. Moreover, those researches are only about the upper limb. Therefore, this peculiar research will contribute to stroke rehabilitation. This study aims to contrast the efficacy of motor learning & mirror therapy programs in ameliorating the mobility of the lower limb of patients with CVA.

Methods:
The study was conducted in R.Y.K (Rahim Yar Khan) at Al-Jannat Medicare & Al-Noor hospital. The time duration was July-2020. The technique used was a randomized controlled trial. The data was collected after ethical approval from Irsa University. The sample consisted of 30 subjects in the age range of 40 to 65 years; both males and females with ischemic and hemorrhagic strokes were incorporated in the study. The subjects excluded were those with Mini-Mental State Examination and any musculoskeletal disorder. Computerized randomization was done at an external place through concealed allocation manner. A total of 5 sessions in a week with a duration of 40 minutes for six weeks were included in the treatment protocol. In this study, the group receiving MRP treatment was Group A, in which manipulation, reaching and different task-specific exercises were included. For lower limb flexion/extension in side lying, abuction/adduction in supine lyingthe of the hip joint. Flexion/extension in (knee joint). Dorsif-Plantar flexion of the ankle joint. Functional mobility exercises include mobility on the bed, side-to-side movement on both affected & unaffected sides, lying on back to a sitting position, and forward-backward stepping. Initially, simple tasks were performed with fewer repetitions with a gradual increase in task complexity & repetitions.

The group receiving mirror therapy was Group B. In this group, activities were performed with the non-affected limbs in front of the mirror. The size of the mirror was 20*25. The guidelines (verbal or visual) regarding the task were given. The mirror was centrally placed. The sound limb was placed the same as the paretic one. Then, participants were commanded to see the mirror for 2 minutes. Motor exercises (unilateral) were performed with the non-paretic limbs. The evaluation of all the patients was done at pre-assessment, mid-assessment & post-assessment. Pre-assessment was performed at 0-week, mid-assessment at 3rd week, and post-assessment at 6th week.

A Modified Fugl Meyer Assessment scale was used to measure the outcomes. SPSS 20 was applied to assess the research facts. Friedman Test was applied for intragroup comparison while inter-group comparison was checked by the Kruskal Wallis test.

Results:
30 participants were in the research, males 21(70%) while females 9(30%). Patients with left hemiplegia were 22(73.33%), while 8 (26.66%) were with right hemiplegia. The mean age was 53.80±7.66(Table # 1).

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Group A %</th>
<th>Group B %</th>
<th>Total with %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>11(73.3%)</td>
<td>10(66.7%)</td>
<td>70%</td>
</tr>
<tr>
<td>Female</td>
<td>4(26.7)</td>
<td>5(33.3)</td>
<td>30%</td>
</tr>
<tr>
<td>Left Hemiplegic</td>
<td>10(66.7%)</td>
<td>5(33.3)</td>
<td>73.33%</td>
</tr>
<tr>
<td>Right Hemiplegic</td>
<td>5(33.3%)</td>
<td>5(33.3)</td>
<td>26.66%</td>
</tr>
</tbody>
</table>

The results presented remarkable differences in mobility in patients with stroke from baseline to after assessment in groups (p< .005). Group A showed the pre-assessment median (IQR)=7(3), mid-assessment median=17(5), and post-assessment median 24(9). Group B showed pre-assessment median 7(3), mid-assessment median=11(7), and post-assessment median 20(2). (Table # 2).

<table>
<thead>
<tr>
<th>Table-II Within-group Contrast of Fugl Meyer Scale.</th>
<th>Friedman test is used.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRE Median(IQR)</td>
<td>MID Median(IQR)</td>
</tr>
<tr>
<td>Group A 7(3)</td>
<td>11(7)</td>
</tr>
<tr>
<td>Group B 7(3)</td>
<td>11(7)</td>
</tr>
</tbody>
</table>

Between-group, the comparison showed that the motor relearning program is more effective in comparison to mirror therapy in terms of lower limb motor function. A significant difference was found between the two treatments. (Table # 3).

<table>
<thead>
<tr>
<th>Table-III Between Group contrast of Fugl Meyer scale.</th>
<th>Karuskal –Walls test is used.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRE Group A Median(IQR)</td>
<td>Group B Median(IQR)</td>
</tr>
<tr>
<td>7(3)</td>
<td>7(3)</td>
</tr>
<tr>
<td>MID 17(5)</td>
<td>11(7)</td>
</tr>
<tr>
<td>POST 24(9)</td>
<td>20(2)</td>
</tr>
</tbody>
</table>

Discussion:
The purpose of the research was to contrast the results of the Motor relearning program & Mirror therapy in stroke patients. These two interventions were analyzed in thirty stroke patients for six weeks. In the trial, the mean age of participating candidates was 53.80±7.66. CVA is a root cause of critical prolonged dysfunction. Motor relearning program and mirror therapy both treatments improved lower limb mobility in patients with stroke but the motor relearning techniques proved to be more efficient as compared to mirror therapy.

The results of this trial are assisted by another research that was carried out in India in 2013. The objective of the research was to compare the clinical outcomes of the bobath approach with a motor learning program in the recovery of motor function of patients suffering from a stroke. The conclusion of that research revealed that a motor relearning program facilitates motor recovery after stroke compared to other treatments. Our study states that mirror therapy is effective in enhancing the lower limb mobility of participants with stroke. This is also reinforced by another research that was carried out by Arya KN and co-workers in 2019. They concluded that Mirror therapy significantly improves functional mobility of the lower limb after stroke. Another study related to this research was carried out by Sütbeyaz S and co-workers in 2007. The results of the research manifested that Mirror therapy facilitates motor recovery of the lower limb. Similarly, the current study is also supported by another study that was conducted in 2015. According to the results of their study Mirror therapy enhances motor recovery in stroke patients. This study is also strongly supported by another study that was carried out in 2018. It was review research & 9 studies were included in that research. The results of their research showed that Mirror therapy improves functional mobility after stroke. Another study that was closely related to our study was conducted in 2017 in UAE. The purpose of the research was to explore & contrast the clinical outcomes of motor relearning program & PNF (Proprioceptive neuromuscular facilitation). They concluded that the motor relearning program was more efficient in enhancing motor function after stroke. Another research that was carried out in 2020 in India analyzed the effects of conventional training & motor relearning programs on motor recovery of patients suffering from a stroke. Results of the research manifested that the motor relearning program was
highly significant in enhancing motor function as compared to conventional training in stroke patients.\textsuperscript{30}

**Conclusion:**
This study concluded that both motor learning & mirror therapy programs are effective in ameliorating the motor function of the lower limb in patients suffering from a stroke. But a motor relearning program is more effective than mirror therapy.

**Disclaimer of the study:** None

**Conflict of Interest:** None

**Funding Disclosure:** None

**References:**


