

A Comparative Study of Mirror Therapy and Sham Therapy with Conventional Rehabilitation in Balance Ability for Geriatric Patients

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Abstract: *Background of the studies:* implication of mirror therapy and shyam therapy for stroke patients proves the changes in their functional activities. *Aim and objective of the study:* Aim of the study is to compare the effect of shyam therapy and mirror therapy with conventional rehabilitation in balance ability for geriatrics. *Methods:* 50 old aged peoples were selected based on criterias, splitted into two groups, and assessed with balance. Group A with shyam and conventional rehabilitation, then Group B with mirror and conventional rehabilitation, after 6 weeks again re assessed and results were interpreted. *Results:* Group A pre test value was 8.36 and post valve was 10.52, Group B pre test value was 7 and post test value was 11.28. *Conclusion:* The statistical report reveals that Group b (mirror therapy) shows significant changes when compared to group A.

Keywords: balance training, geriatrics, mirror therapy, shyam therapy

1. Introduction

Geriatric is a specialty that focuses on health care of the elderly people. It aims to promote health by preventing and treating diseases and disability in older adultd there is no set age at which patient may be under the care of a geriatrician or geriatric physician, a physician who specializes in the care of elderly people. [1] Balance problems and falls are common among the elderly and are a leading institutionalization in this Group that result in over 5 million patient out patient visits per year .[3] it is estimated that between 28% and 35 % of individual over age 65 falls each year, with a fifth of those requiring medical attention. The number of falls increases to over 40% for those 65 and older. [2] Balance disorder in the geriatric population are often a multifactorial condition. Weakness in the core stabilizing muscles, altered muscle activation pattern, loss of proprioception, and an inability to control normal postural sway can all result in decreased balance in the elderly. [5] A mirror is placed in the patient's mid sagittal plane, with the affected limb in front of it, so that the affected limb is blocked and the patient can only se the reflection of the intact limb.[4] Movement of the intact limb gives the patient the illusion in which inputs are perceived through the affected limb behind the mirror[7]

Mirror therapy, with its low cost and simplicity, may be a suitable alternative. Ramachandran and Rogers Ramchandran introduced the use of visual illusions created by a mirror as a treatment for phantom pain. Mirror therapy has been used in patients suffering from stroke, cerebral palsy, complex regional pain syndrome, phantom limb pain and fracture rehabilitation.[9.11] Three particular conditions that have been studied the most are stroke, CRPS and phantom limb pain. During mirror therapy, a mirror is placed in the patient's mid sagittal plane, thus reflecting movements of the non paretic side as if it were the affected side .[12] This arrangement is suited to create a visual

illusion whereby movement of or touch to the intact limb may be perceived as affecting the paretic or painful limb[8]

The underlying mechanisms of the effects in these three patient groups have mainly been related to the activation of mirror neurones. which may also be activated when observing others perform movements and also during mental practice of motor tasks.[15] Mirror neurons were found in areas of the ventral and inferior premotor cortex associated with observation and imitation of movements and in somato sensory cortices associated with observation of touch. Mirror therapy in geriatric patients [10].

Motor networks may become activated because of increased attention towards the affected limb, which is mediated by the illusion of a paretic / amputated limb that has been 'healed' Geriatrics patients may end up in a state of "learned non-use" of the paretic limb, therefore similar to the rationale for constraint induced therapy MT is said to increase the patient's attention toward the limb, which in turn increases use of that limb and enhances limb function. These ipsilateral projections may become unmasked and MT may promote the recruitment of these pathways for movement of the limb.

Mirror neurons are unique neurons in the premotor cortex that activate when an individual perform s and action and when that individual observes that action being performed. Since MT is a form of action observation, it is therefore believed to activate the mirror neuron. system. Areas of the brain that include the mirror neuron system activated through action observation excite the cortico spinal pathway inducing motor learning and neuro rehabilitation.

2. Methodology

Study design : Observational study
Study type : Random sampling

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Sample size : 50 subjects
 Study duration : 6 weeks
 Study location: Old aged home, Ortho clinic

Inclusion Criteria

- Aged group 60-65 years
- Both male and female
- Balance impairment
- Dependent mobility

Exclusion Criteria

- Non co-operative
- Major fracture in Lower limb
- Mental Retardation
- Alzheimer's disease
- Cognitive impairment

Out Come Measure

Tinetii balance assessment tool

Tools Used

- Mirror
- Fabric cloth

Procedure

- The subjects who fulfil the inclusion criteria were included and informed consent was obtained from them.
- Subjects demographic data and assessment was noted. Subjects were allotted in tow groups
- Group A (sham therapy), Group B (mirror therapy)
- The pre test was taken and the exercise was demonstrated to the subjects involved in the study and was informed that they have to do the exercise regularly and can withdraw from the study, if they have any discomfort or difficulty

Group A: Control Group

- Sham therapy and conventional rehabilitation for one hour (30 min and 30 min) five day per week for six weeks
- The control is trained with the below exercises:
- Hip knee ankle exercises.
- Knee extension with ankle
- Knee flexion beyond 90 degree.
- Post intervention measurement will be taken after 6 weeks by using tinetti balance assessment tools to find out the balance ability of geriatric patients.

Group B: (Experimental Group)

Mirror therapy and conventional rehabilitation for one hour (30 min and 30 min) five days per week form six weeks for geriatrics subjects.

- Hip knee ankle exercises
- Knee extension with ankle
- Knee flexion beyond 90 degree

3. Data Analysis

The statistical analysis were performed by unpaired t-test was used to compare the pre and post value of tinetti balance assessment score.

The unpaired t method test the null hypothesis that the population means related to two independent, random samples from an appropriates normal distribution are equal.

The formula for unpaired t test is given below:

$$\text{Test Statistic of Unpaired Samples} = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{s^2 \left(\frac{1}{n_1} + \frac{1}{n_2} \right)}}$$

where

$$s^2 = \frac{\sum_{i=1}^{n_1} (x_i - \bar{x}_1)^2 + \sum_{j=1}^{n_2} (x_j - \bar{x}_2)^2}{n_1 + n_2 - 2}$$

Where,

x1 = Mean of first set of values

x2 = Mean of second set of values

S1 = Standard deviation of fist set of values

S2 = Standard deviation of second set of values

n1 = Total number of values in first set

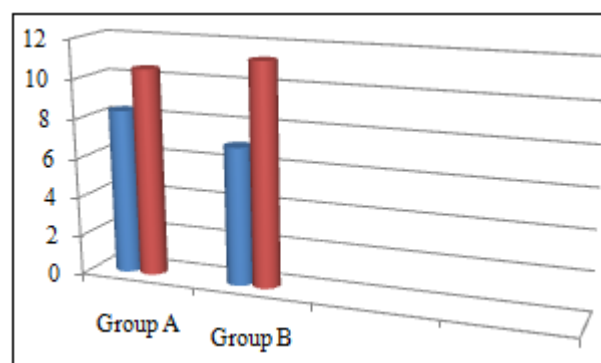
n2 = Total number of values in second set

Where , x bar 1 and x bar 2 are the sample means, s² is the pooled sample variance, n₁ and n₂ are the sample sizes and t is a student t quantile with n₁+n₁-2 degrees of freedom.

Comparison of Group A and Group B

Table

Outcome Measures	Mean		Standard deviation		t-value	p-value
	Pre Value	Post Value	Pre Value	Post Value		
Shyam therapy	8.36	10.52	1.89	2.58	3.3734	0.0015
Mirror therapy	7	11.28	1.91	2.23	7.2861	<0.0001



Graph

4. Result

As a result group A (sham therapy) pre mean value was 8.36 and post mean value was 10.52 and group B (mirror therapy)pre mean value was 7 and post mean value was 11.28 and p-value for group A 0.0015 and p-value for group B was <0.0001

5. Discussion

This study conducted to investigate the effect of mirror therapy on the balance in patient with sub acute stroke. According to the result, the treatment group showed a significant decrease in mirror therapy in geriatric patients. Stevens and Stoykov suggested that mirror therapy is

related to motor imagery and that the mirror provides visual feedback of the successful performance of the imagined action with the limb. Effect of mirror therapy on brain activity as been investigated in a number of study.

The participants repeatedly performed dorsi flexion of the ankles with the lower limb place in front of the mirror. The mirror therapy group achieved as significant improvement in gait ability than the sham therapy. Feltham showed that visual feedback treatment using a mirror as positive effect on the bilateral coordination ability and neuro muscular activity among spastic hemiplegic patients. As a cognitive intervention method, mirror therapy cause s activation of the frontal or parietal lobe in the corresponding motor regions, and area known as mirror neurons through only observing the behaviour of others.

Therefore, mirror therapy could play an important role in learning a new skill or understanding the behaviour of others, which can be used to motivate the stroke patients. The mirror therapy is performed on the non- paralysed side by moving the limbs of stroke patients. The movements of paralysed limb through the reflection in the mirror shows a visual illusion of normal movements. This method for treating brain injury is based on the principles of the synaptic plasticity.

Further studies states that, balancing technique is helpful in terms of geriatric patients by giving mirror therapy than sham technique.

6. Limitation

- The sample size is small.
- The duration of the study is less

7. Recommendation

- Sample size should be higher for generalization
- The intervention can be given for a longer duration for more accurate results.

8. Conclusion

This study was conducted to investigate the effect of mirror therapy in geriatrics patients were with sham therapy (group A) and Mirror therapy (group B) were treated with passive movements, stretching for 6 weeks. According to the statistical results, group B with mirror therapy shows significant results. Both group were measured with tinetti assessment scoring Group B showed more improvement in balance.

Sterens and stoykov suggested that mirror therapy is telated to motor imaginary and that the mirror provides visual feedback of successful performance of the imagine action. The participants performed exercises for 5 days in a week,. The mirror therapy group achieved statistically significant higher level of improvement in balance than sham therapy. I, yuncharqued that unstant self-analysis and correlation for the patients are possible, as they visually confirm their own physical alignment through mirrors.

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