



ISSN: 2230-9926

Available online at <http://www.journalijdr.com>

IJDR

International Journal of Development Research
Vol. 12, Issue, 05, pp. 56190-56193, May, 2022



RESEARCH ARTICLE

OPEN ACCESS

EFFECTIVENESS OF MIRROR THERAPY VERSUS CONVENTIONAL PHYSIOTHERAPY IN IMPROVING FUNCTIONAL CAPACITY IN PATIENTS WITH COMPLEX REGIONAL PAIN SYNDROME

*Dr. Akula Mayura Vani

Assistant Professor, Care College of Physiotherapy, Mansoorabad, L.B Nagar, Hyderabad. Telangana

ARTICLE INFO

Article History:

Received 10th February, 2022
Received in revised form
20th March, 2022
Accepted 25th April, 2022
Published online 27th May, 2022

Key Words:

Mirror Therapy,
Conventional Therapy,
CRPS, TENS.

*Corresponding author:

Dr. Akula Mayura Vanil

ABSTRACT

Background: CRPS is characterized by exquisite burning pain that begins in the distribution of an injured peripheral nerve and then spreads beyond it. It is always associated with an injury to a major nerve. Mirror therapy (MT) is a non-pharmacological and alternative treatment strategy to use a mirror to create a reflective illusion of an affected limb in order to trick brain into thinking and movement occurred without pain. Conventional Physiotherapy (CT) is defined as the treatment of movement disorders caused by impairments of joints and the muscles that move the joints. **Objective:** To find out the effectiveness of Mirror Therapy Versus Conventional Physiotherapy in improving functional capacity in patients with CRPS. **Method:** 40 CRPS subjects were included in the study using random sampling and divided into 2 groups, Group A (Experimental) and Group B (Control). Group A subjects were treated with Mirror therapy exercises, and Group B subjects were treated with TENS and Conventional Therapy for 8 weeks. **Results:** Both the groups showed statistically significant different pre and post intervention. However the different between the groups was not statistically significant. **Conclusion:** The present study concluded that both groups had significant improvement and were equally effective in reducing pain and improving grip strength. But on comparing Groups A and B, no group seemed to be superior to the other.

Copyright © 2022, Dr. Akula Mayura Vanil. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Dr. Akula Mayura Vanil. "Effectiveness of mirror therapy versus conventional physiotherapy in improving functional capacity in patients with complex regional pain syndrome", *International Journal of Development Research*, 12, (05), 56190-56193.

INTRODUCTION

Complex regional pain syndrome (CRPS) is a chronic pain disorder characterized by excessive sensitivity and discomfort in the hands, elbows, knees, and legs with no evident explanation for the severity of the pain (Robert, 2019). Causalgia, also known as CRPS, is characterised by excruciating burning pain that originates in the distribution of an affected peripheral nerve and later expands beyond it, and is invariably linked to a significant nerve injury (Mitchell, 1872). CRPS, which includes pain, swelling, vasomotor instability, sudomotor irregularity, and motor function impairment, is uncommon following hand surgery and can be worsened by post-operative treatment (Harden, 2006). In 1864, the pioneer of American neurology, Silas Weir Mitchell, published the first complete description of CRPS (Mitchell, 1872; Harden, 2006). Evans coined the acronym RSD (Reflex Sympathetic Dystrophy) to describe this illness in 1946. Evans thought that afferent activity set off a reflex in the spinal cord, which then increased activity in the sympathetic efferent nerve, resulting in dystrophic alterations in the limb's periphery, this notion has gaining traction (Kevin, 2018).

According to most retrospective studies, CRPS is one of the uncommon disorders, with an incidence of 2%. According to a research conducted in the United States, the incidence is 5.5 cases per lakh people per year (De Mos, 2007). The upper extremity is twice as likely to be damaged as the lower extremity, and fracture is the most prevalent cause (46 percent) (Veldman, 1993). According to a research from the Netherlands, there are 26.2 incidents per lakh every year. It was more common in individuals aged 40 to 49 and in women (76 percent) (Lau, 2004). Mirror therapy (MT) is a non-pharmacological and alternative treatment technique that involves using a mirror to create a mirrored illusion of an injured limb in order to deceive the brain into believing that movement is painless (Kodeeswara Prabu, 2015). A mirror box is a device that makes it simple for the therapist to generate this illusion. It is a box with one mirror in the centre, and the hands are positioned on either side of it in such a way that the afflicted limb is constantly covered and the unaffected limb is maintained on the other side, whose reflection can be seen in the mirror (Kodeeswara Prabu, 2015). The treatment of movement disorders caused by limitations of joints and the muscles that move the joints is known as conventional physiotherapy (CT) (Christian Callens and Michael Nisand, 1992). In physiotherapy,

mobilizations, strengthening, and stretching methods are the three basic components of traditional therapy (John Brazier, 2017; Paternostro-Sluga, 2008). The physiotherapist will choose the appropriate therapy strategy based on the disorder's alleged cause. In the absence of a disease hypothesis, the therapeutic strategy will be ill-defined and varied, with transient effects occasionally occurring. (Jack, 2011). Since a long time, conventional physiotherapy has been a therapeutic option for CRPS; however, mirror therapy has lately emerged as a preferable treatment alternative. The purpose of this study is to see how successful motor imagery with MVF (mirror visual feedback) therapy is for CRPS patients. In addition, the study looked at the efficiency of conventional physiotherapy in treating CRPS symptoms and compared the results of mirror therapy with conventional treatment.

METHODS

An experimental study was conducted with data collected from KIMS during the period from April 2010 to December 2010. The inclusion criteria for the study comprised of subjects aged between 20 to 60 years and with enough cognitive capacity to follow the therapist commands. Patient with at least 5 degrees of wrist extension in CRPS hand in antigravity position and complaint of weakness, hyperalgesia and allodynia were included in the study. No restriction was placed on the gender of the subject. The subjects with congenital heart diseases, vision impairment, auditory impairment and severe depression were excluded. Similarly, subjects with other associated musculoskeletal condition, upper extremity peripheral neuropathy, severe shoulder, elbow, wrist or finger contractures that would preclude a passive range of motion of arm were also excluded from the study. After careful consideration of the inclusion and exclusion criteria, a total of 40 subjects were chosen to participate in the study, and their written consent was acquired. The subjects' confidentiality was preserved and maintained throughout the study, and no costs were incurred by them. Age, gender, and contact information were gathered by personal interview and documented on a pre-designed and pretested data collecting sheet. Participants were then randomly assigned to one of two groups: Group A, which received mirror therapy twice a week for eight weeks, with two 30-minute sessions each time, and Group B, which received task-oriented conventional therapy and TENS twice a week for eight weeks, with two 30-minute sessions each time.

Protocol for Group A: The subject was requested to sit comfortably with an angle-adjustable frame and a mirror board perpendicular to the midline, with the unaffected side in front of the reflecting surface of the mirror and the afflicted side hidden behind the mirror. During mirror therapy, the afflicted limb was relaxed and rested on a support platform behind the mirror. The subject was instructed to gaze in the mirror and imagine the unaffected side as the affected body part. In front of a mirror, the subject exercised the unaffected body part in a complete and pain-free range in all directions. The subject envisioned the afflicted limb moving painlessly after seeing the mirror image. Wrist flexion and extension exercises, finger opposition, forearm pronation and supination exercises, grasping activities including prehension, precision utilizing balls, handkerchiefs, pins, and dynamometer were among the exercises conducted. These exercises are done in two sessions each day, each lasting 30 minutes with a 15-minute break in between. They were done with 10-20 repetitions with a pause of 10 seconds in between.

Protocol for Group B: TENS was delivered to the median, ulnar and radial nerves at the wrist regions. On the flexor group of muscles and the ventral side of intrinsic muscles of the hand, electrodes for the median and ulnar nerves were inserted. They were positioned on the extensor group of muscles and the dorsal side of intrinsic muscles for the radial nerve.

The stimulation frequency was set at 100 Hz for 15 minutes at a level just below the motor threshold. The traditional rehabilitation regimen included upper-limb strength training with weight cuffs and TheraBand, as well as functional mobility training with balls and

small edged materials. Other exercises included wrist flexion and extension, supination and pronation on a re-education board; gripping exercises, finger exercises including prehension and precision exercises; finger opposition exercises; grasping exercises with a ball included pressing the ball, rotatory movement on the ball, moving to and fro, tapping on the ball, grasping the ball while grasping making a claw position of hand, bouncing the ball with both hands, etc. These exercises are performed with 10-20 repetitions with a rest of 10 seconds for two sessions each day, each lasting 30 minutes with a 15-minute break in between. The assessment of functional outcome was done using Visual Analog scale (VAS) and Grip Strength scale (GSS).

Data Analysis

Data analysis was performed by SPSS (version 17) for windows. Alpha value was set as 0.05. Descriptive statistics was performed to find out mean, standard deviation for the demographic variable and outcome variables. Chi square test was performed to find out gender distribution among both groups. Unpaired t test was used to find out significant differences among demographic variable such as age. Mann Whitney U test was used to find out significant differences among baseline data of the outcome variable such as Visual analog scale. Unpaired t test was used to find out difference in scores between groups for shoulder Grip strength scale. Paired t test was used to find out significant difference with in group for shoulder Grip strength scale. Mann Whitney U test was used to find out difference in scores between groups for Visual analog scale. Wilcoxon signed rank sum test was used to find out significant difference with in groups for VAS. Microsoft excel, word was used to generate graph and tables.

RESULTS

In group A, the Visual analog scale score reduced from 5.60 with standard deviation of 1.19 to post Visual analog scale score of 3.40 with standard deviation of 2.21 which was statistically significant (p value <0.003). Similarly, the grip strength scale (Kilo Grams) score increased from 21.98 with standard deviation of 2.76 to post Grip strength scale (Kilo Grams) score of 29.39 with standard deviation of 6.75 which was statistically significant (p value <0.0001).

Table I. Baseline data for demographic variable

SL. No:	Variable	Group A	Group B	p-value
1	Age	37.10±12.09	39.70±14.25	>0.537
2	Gender(M/F)	8/12	10/10	>0.525

Table II. Baseline data for outcome variable

S.No:	Variable	Group A	Group B	p-value
1	Visual analog scale	5.60±1.19	5.35±1.14	>0.478
2	Grip strength scale(Kilo Grams)	21.98±2.76	20.98±2.34	>0.227

Table III. Pre-post comparison within Group A

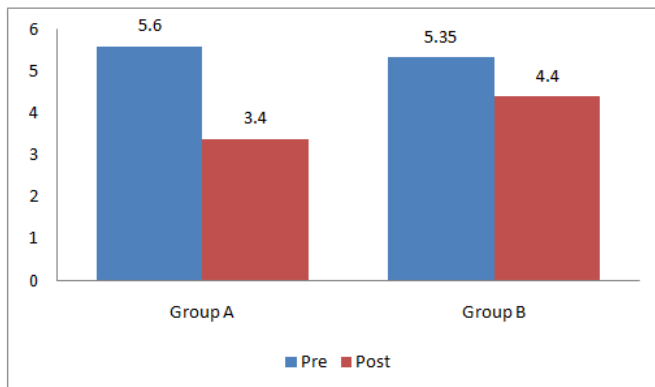
S.No:	Variable	Pre	Post	p-value
1	Visual analog scale	5.60±1.19	3.40±2.21	<0.003
2	Grip strength scale (Kilo Grams)	21.98±2.76	29.39±6.75	<0.0001

Table IV. Pre-post comparison within Group B

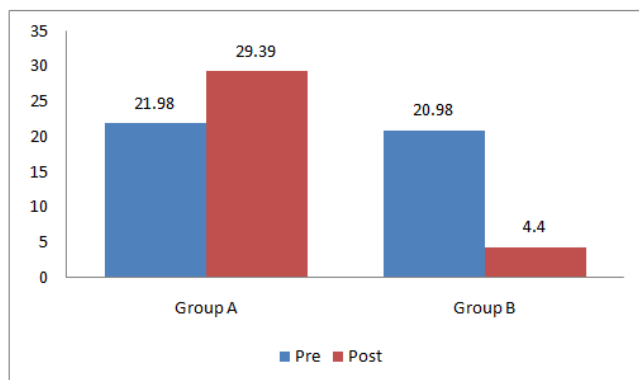
S.No:	Variable	Pre	Post	p-value
1	Visual analog scale	5.35±1.14	3.50±2.21	<0.001
2	Grip strength scale (Kilo Grams)	20.98±2.34	29.02±6.93	<0.0001

In group B the Visual analog scale score reduced from 5.35 with standard deviation of 1.14 to post Visual analog scale score of 3.50

with standard deviation of 2.21 which was statistically significant (p value <0.001) (Wilcoxon Z value is-3.241). Similarly, the grip strength scale (Kilo Grams) score increased from 20.98 with standard deviation of 2.34 to post Grip strength scale (Kilo Grams) score of 29.02 with standard deviation of 6.93 which was statistically significant (p value <0.0001) (t value is -5.172).



Graph I. Visual analog scale within group A & B

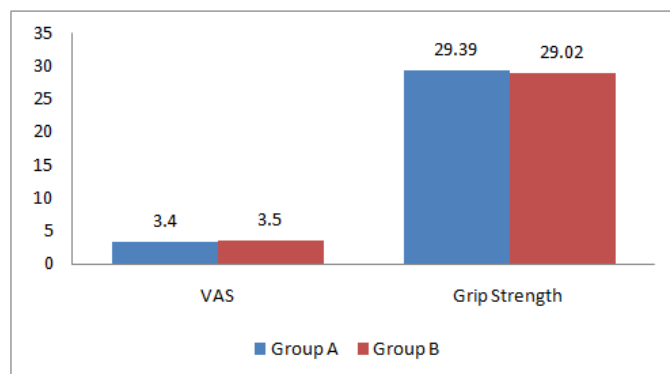


Graph II. Grip strength scale (Kilo Grams) within group A & B

Table V. Difference between groups

S.No:	Variable	Group A	Group B	p-value
1	Visual analog scale	3.40±2.21	3.50±2.21	>0.947
2	Grip strength scale (Kilo Grams)	29.39±6.75	29.02±6.93	>0.867

When comparing between group A and B, the mean Visual analog scale post score in Group A and B were 3.40 with a standard deviation 2.21 and 3.50 with a standard deviation 2.21 respectively, which was not statistically significant (p value >0.947).



Graph III: Between group analysis of visual analog scale and grip strength

The mean Grip strength scale (Kilo Grams) post score in Group A and B were 29.39 with a standard deviation 6.75 and 29.02 with a standard deviation 6.93 respectively, which was not statistically significant (p value >0.867).

DISCUSSION

The present experimental study was conducted to investigate response to mirror therapy and tens with conventional therapy in CRPSt1. In the present study, after the triple trial it was found that the Visual analog scale score reduced from 5.60 with standard deviation of 1.19 to 3.40 with standard deviation of 2.21 in Group A, which was statistically significant (p value < 0.003). Similarly, the Grip strength scale (Kilo Grams) score increased from 21.98 with standard deviation of 2.76 to 29.39 with standard deviation of 6.75 which was statistically significant as well (p < value 0.0001). Even the grip strength increased after the intervention. The result is in line with a previous study by Angelo Cacchio, Elisabetta et.al⁽¹³⁾ conducted to assess the effect of Mirror Therapy in CRPS type. The study showed that VAS score reduced 8.7 with standard deviation of 0.6 to post test 5.1 and standard deviation of 2.6 (p value is < 0.0001). The difference in the p-value of <0.003 in present study as compared to that of Angelo et.al might be due the fact that the current study had a very small sample size, outcome measures were less used and follow up was rather different. In group B, the Visual analog scale score reduced from 5.35 with standard deviation of 1.14 to post Visual analog scale score of 3.50 with standard deviation of 2.21 which was statistically significant p value 0.0001. Similarly, the Grip strength scale (Kilo Grams) score increased from 20.98 with standard deviation of 2.34 to 29.02 with standard deviation of 6.93 which was statistically significant p value 0.0001. The result is again in line with a previous study by Bilgili, Adem et al, which had found significant improvement with p value less than 0.0001. The difference in the p value between the two studies can again be attributed to difference in sample size with varied demographic variables.

CONCLUSION

According to the findings of this study, both groups improved significantly in terms of pain reduction and grip strength. However, when the groups were compared, it was shown that neither group was better than the other in terms of enhancing strength or lowering pain. Despite the facts that group A experienced higher pain relief and improved grip strength, the difference was not statistically significant. As a result, it can be stated that when both treatments are significantly effective when performed individually.

REFERENCES

Adem Bilgilia, Tuncay Çakırb,*, ,Sebnem Kolda,s Doganb, Tülay Erçalık, Meral Bilgilişoy Filizb and Füsün Toramanb . “The effectiveness of transcutaneous electrical nerve stimulation in the management of patients with complex regional pain syndrome: A randomized, double-blinded, placebo-controlled prospective study”, *Journal of Back and Musculoskeletal Rehabilitation* 29 (2016) 661–671 661.

Angelo Cacchio, , Elisabetta De Blasis, , Vincenzo De Blasis, , Valter Santilli, Giorgio Spacca, . Sage journals, “Mirror Therapy in Complex Regional Pain Syndrome Type 1 of the Upper Limb in Stroke Patients”, Volume: 23 issue: 8, page(s): 792-799 *Neural Rehabilitation and Neural Repair*, May 22, 2009.

Christian Callens and Michael Nisand . “Inductive Physiotherapy”- principle-treatment-formation, Wimpheling, Strasbourg –France, 67000, 1992.

De Mos M, de Bruijn AG, Huygen FJ, Dieleman JP, Sticker BH, Sturkenboom. MC. The incidence of complex regional pain syndrome: A population-based study pain. 2007; 129:12-20.

Harden RN, Bruehl S. Introduction and diagnostic considerations. In: Hatden, R, ed. Complex regional pain syndrome: Treatment

- guidelines, Mildford, CT: Reflex Sympathetic Dystrophy Association (RSDA) press: 2006; 1-9
- Jack W. Tsao, Mirror therapy in Phantom limb pain, Commander, Medical Corps, U.S. Navy, Director of Traumatic Brain Injury Programs, U.S. published on March 8, 2011.
- John Brazier, Julie Ratcliffe, in International Encyclopedia of Public Health (Second Edition), "Measurement and valuation of Health for Economic Evaluation", 2017.
- Kevin B. Guthmiller; Matthew Varallo Pain, Complex Regional Pain Syndrome (Reflex Sympathetic Dystrophy, RSD, CRPS) 1USC Keck School of Medicine, 2Department of Orthopedic Surgery, University of Kentucky School of Medicine. November 18, 2018.
- Lau FH, Chung KC. Silas Weir Mitchell, MD: The physician who discovered Causalgia, J Hand Surg.2004; 29A; 181-7 .
- Mitchell, S.W. (1872). Injuries of Nerves and their Consequences. Philadelphia: JB Lippincott. 377 pages. 1872
- P. Kodeeswara Prabu, Dr. Jeyagowri Subhash, Dr. Sanjay Rakh M.S, "Mirror Therapy" IOSR Journal of Nursing and Health Science (IOSR-JNHS), Volume 4, Issue 6 Ver. V (Nov. - Dec. 2015), PP 01-04.
- Paternostro-Sluga, Tatjana; Grim-Stieger, Martina; Posch, Martin; Schuhfried, Othmar; Vacariu, Gerda; Mittermaier, Christian; Bittner, Christian; Fialka-Moser, Veronika, Ingenta connect, "Reliability and Validity of the Medical Research Council(MRC) scale and a Modified Scale for Testing Muscle Strength in patients with Radial Palsy, Journal of Rehabilitation Medicine, Volume 40, Number 8 , September 2008, pp. 665-671(7)
- Robert D. Foreman, Robert M. Levy, International Neuromodulation Society. "Neuromodulation- Technology at the Neural Interface". Clinical Neurology 1525-1403, 2019, 52/138.
- Veldman PH, Reynen HM, Arntz IE, Goris RJ, signal and symptoms of reflex sympathetic dystrophy: prospective study of 829 patients. Lancet.1993; 342:1012-6.
