

COMPARISON OF EFFECTIVENESS OF DRY NEEDLING AND SHAM THERAPY ON HAND FUNCTION IN STROKE PATIENTS

¹DR.MANSI TRIVEDI, ²DR.PREXA MISTRY

¹ASSISTANT PROFESSOR, ²BPT

PARUL INSTITUTE OF PHYSIOTHERAPY,

VADODARA, INDIA.

ABSTRACT

BACKGROUND: Spasticity is a common symptom that can be detrimental to the quality of life and daily function of patients with stroke. Not only are the abilities to stand, balance and walk affected, but also the ability to use the upper limb and hand in its diversity of functions in everyday life. Loss of independence of upper limb functions contributes enormously to functional disability, affecting quality of life and independence in 'basic' (washing, grooming, feeding, dressing, etc.) and 'instrumental' activities (shopping, home/financial management, etc) of daily living. Recently, muscle spasticity can be treated by various non pharmacological procedures, among them dry needling is an emerging technique to decrease the rate of muscle spasticity.

OBJECTIVE: To evaluate the effectiveness of trigger point dry needling versus sham therapy in patients with affected hand functions.

METHODOLOGY:

Study design: Experimental study

Method: Individuals were selected from the population according to inclusion criteria and were divided into two equal groups. Group A was given dry needling and group B was given sham therapy. The patients received deep dry needling for (abductor pollicis, opponens pollicis, lumbricals (palmar and dorsal interosseous) and abductor pollicis and abductor digiti minimus muscle. The outcome measures were taken before and after the programmed schedule of 1 session a week for 3 weeks for dry needling and 1 session a week for 3 weeks for sham therapy.

Outcome Measures: Modified Ashworth Scale (MAS), Action Research Arm Test (ARAT) and Fugl Meyer Assessment (FMA).

RESULTS: Data were analyzed using independent t-test, there was significant improvement seen in the hand functions of the patients in group-A compared to patients in group-B.

CONCLUSION: The finding of this study is suggesting that dry needling with conventional therapy program is more effective in improving Hand function in stroke patient compare to sham therapy with conventional therapy.

KEY WORDS: Hand functions; trigger point dry needling, sham therapy, Modified Ashworth scale, Fugl Meyer.

INTRODUCTION

A stroke is caused by a disruption of the blood supply to the brain that leads to damage of brain tissue (thesis). Stroke is defined as a clinical syndrome consisting of rapidly developing clinical signs of focal (or global in case of coma) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than of vascular origin. Motor impairments are common after stroke, and a critical factor influencing the patient's ability to live independently. Stroke is one of the leading causes of death in India. Among the surviving patients, 15-30% becomes severely handicapped and 40% are left with

functional deficits, resulting in problems with major components of functional independence: motor, sensory and cognitive functions. Spasticity is common symptom that can be detrimental to the quality of life and daily function of patients with stroke. Spasticity is the velocity dependent increase in tonic stretch reflexes with exaggerated tendon jerk, resulting from hyper excitability of the stretch reflex. The prevalence of spasticity 6 months after first ever stroke is around 43%. Spasticity must be treated to prevent function deterioration, and to reduce the impact on activities of daily living and social participation. Weight bearing of the upper extremity is essential in motions such as standing up by pushing a hand against the floor. The controlled movements of the proximal regions required for fine hand motions are also developed through upper extremity weight bearing because they increase pressure on the joint to stabilize the humerus in the articular fovea, increase proprioceptive stimuli, and induce co-contraction of the muscles around the joint. Upper extremity weight bearing exercises includes motions to support or push something with the hands and being in quadruped, player, and tripod positions.^[8]

There is the great effect of weight bearing exercise on stroke patients. The upper extremity weight bearing exercises positively affects stroke patient's ability to recover their capacity to perform upper extremity activities, such as grasping power Dry needling is a technique physical therapist use for the treatment of pain and movement impairments. Dry needling involves a thin filiform needle that penetrates the skin and stimulates underlying muscular and connective tissues. The needle allows a physical therapist to target tissues that are not manually palpable. Preliminary report supports that dry needling improves pain control, reduces muscle tension, and normalizes dysfunction of the motor end plates, the site at which the nerve impulses are transmitted to muscle. This can help speed up the patient's return to active rehabilitation.^[10]

AIMS: To compare the effectiveness of dry needling and sham therapy on hand function in stroke patients.

OBJECTIVES: To find out the effect of dry needling and conventional therapy on hand functions in stroke patients.

To find out the effectiveness of sham therapy on hand functions in stroke patients.

To compare the effectiveness of dry needling and sham therapy on hand functions in stroke patients.

METHODOLOGY

Source of data: Various OPDs of Vadodara

Study design: Experimental study

Sampling technique: convenient sampling method

Study population: patients with affected hand functions

Study sample: 19

Study duration: dry needling - once a week, conventional therapy - 3 sessions per Week, ultrasound- once a week.

Total study duration: 3 weeks

CRITERIA FOR SELECTION INCLUSION CRITERIA

Participants in the trials had to meet all the following inclusion criteria for the trail to be included in the review.

- Age group between 30-65 years.
- Patients diagnosed with CVA.
- Male/female
- Medically stable after CVA.

EXCLUSION CRITERIA: Participants in the trial met any of the exclusion criteria; the trail was not included in the review.

- Acute stroke
- Patients with upper limb fracture

- Patients diagnosed with any other neurological disorder
- Patients with severe cognitive impairments
- Patients with artificial joints
- Patients with brain injury and surgery
- Patients with sensory impairment

• METHOD

Patients diagnosed with affected hand functions were selected for the study between the age group of 30-65 years. The participant were randomly assigned into 2 groups, group-A and group-B. The study consisted 19 participants, 10 Participant in group-A and 9 participant in group-B. Participants were explained the procedure and purpose of the study and written informed consent was taken in an understandable language. All participants were provided materials involving treatment protocol with explanation of exercise.

Group A: subjects received dry needling.

Group B: subjects received ultrasound as sham therapy.

Group A: Group A consist of 10 subjects with affected hand functions and was given dry needling for 3 weeks 1 session per week and conventional therapy program was given for 3 weeks 3 sessions per week. After obtaining verbal informed consent the patient was given dry needling for 1 session muscles treated was adductor pollicies, opponet pollicies, lumbricals, and abductor pollicies on the weak hand with the patient in a supine position and forearm in pronation. Duration of needling for each muscle was 1 minute. The needle was inserted deeply perpendicular to the skin using fast-in and fast-out cone shape technique.

DN of Adductor pollicies Muscle: The adductor pollicies originates in the carpometacarpal region of the index and middle fingers. The adductor pollicies muscle adducts the thumb towards the index finger. *Needling technique:* A short thin needle such as 15mm is used to needle the adductor pollicies muscle.

Group B: This group consists of 9 participants with affected hand functions and this group was given ultrasound as the sham therapy for 3 weeks 1 session per week and conventional therapy was given for 3 weeks 3 sessions per week.

CONVENTIONAL THERAPY PROGRAM

- Stretching exercise of hand muscles (10 repetitions)
- Weight bearing exercise (10 repetitions)
- Hand gripping exercise: (10 repetitions)
 - Squeeze ball
 - Table roll
 - Finger squeeze
 - Finger tip pinch
 - Finger spread

OUTCOME MEASURES: Outcome measures taken before and after treatment session:

Fugl- Meyer assessment

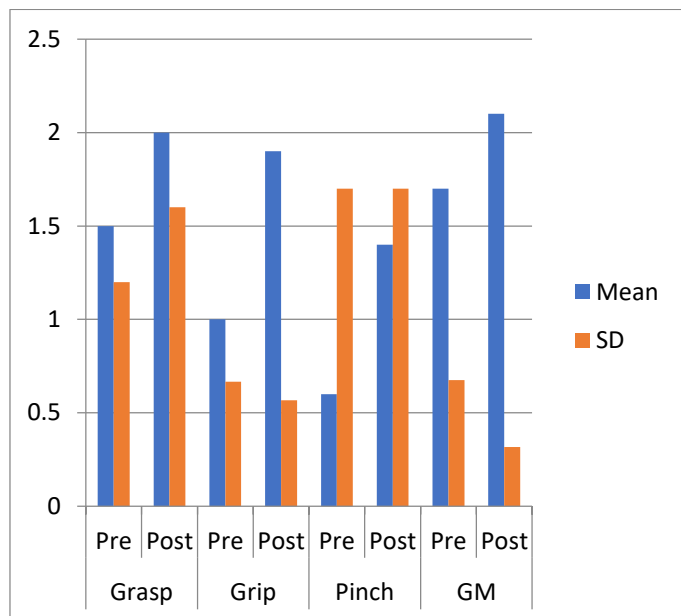
Action Research Arm Test

STATISTICAL ANALYSIS

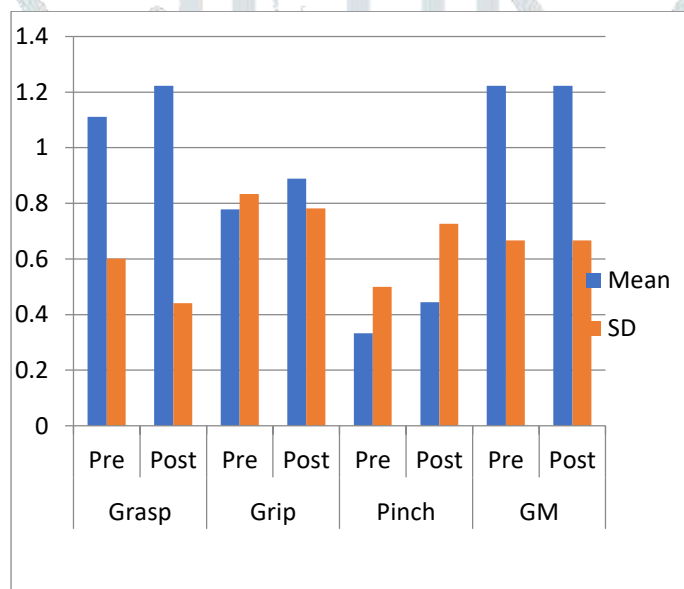
Statistical Methods:

Descriptive statistical analysis was carried out in the present study. Out Come measurements were measured using ARAT and FMA presented as mean \pm SD. Significance was assessed at 5% level of significance $p < 0.005$ (2-tailed hypothesis test considered). Paired 't' test as a parametric had been used for analysis of Action Research Arm Test and Fugl-Meyer Assesment within the Group A and Group B. Independent 't' test as a parametric had been used the compare the means of Action Research Arm Test and Fugl-Meyer Assesment between the groups. The Statistical software namely SPSS 17.0 was used for the analysis of the data

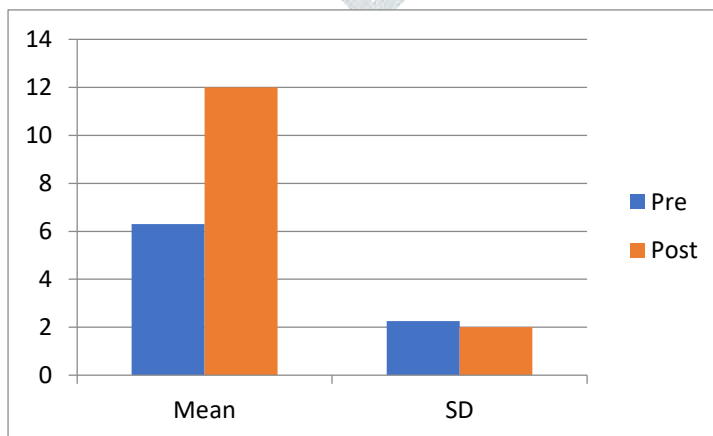
RESULT



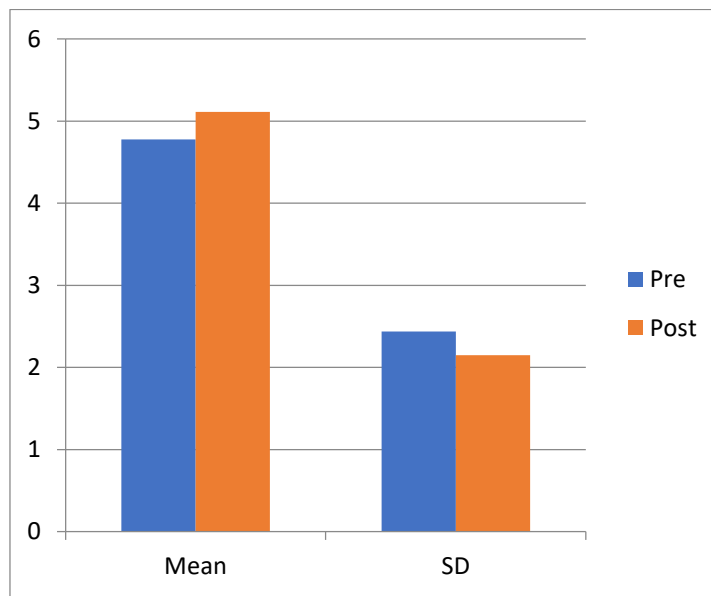
Showing comparison of ARAT score pre & post intervention Group-A



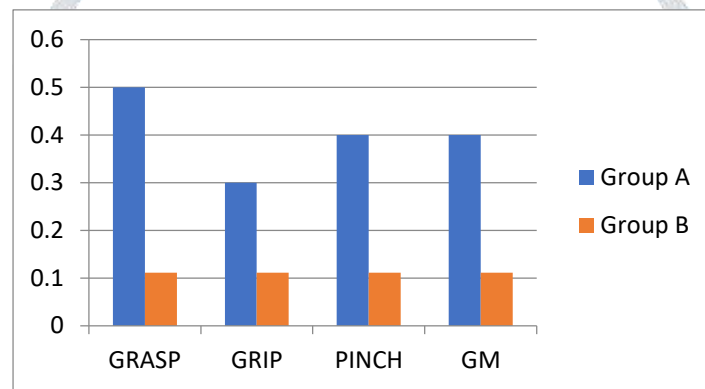
showing comparison of ARAT score pre & post intervention Group-B



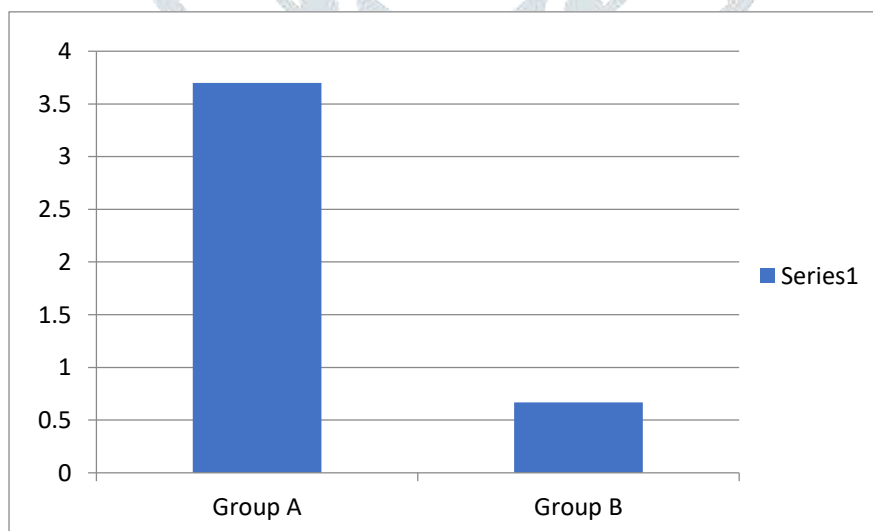
showing comparison of FUGL-MEYER ASSESMENT score pre & post intervention Group-A



Showing comparison of FUGL-MEYER ASSESSMENT score pre & post intervention Group-B



Showing comparison of mean of Group-A and Group-B for ACTION RESEARCH ARM TEST



showing comparison of mean of Group-A and Group-B for FUGL-MEYER

DISCUSSION

Affection of the hand function is the common problem for patients after stroke. It is also problematic for the clinicians working with this client because it can limit rehabilitation success. Therefore, it is important to control affection of hand function to facilitate upper limb function after stroke. The purpose of this case study was to assess the effect of DN on a participant with affected hand function with stroke. This result demonstrates

beneficial effect of DN on post stroke affected hand function resulting in the improvement of hand function. Group A was intervened with DN and conventional therapy programme where as Group B was intervened with Ultrasound and conventional therapy. Outcome measures included ARAT and FMA. Outcomes were measured prior to the treatment and at the end of the treatment of 3 weeks. First objective of the study was to find out the effect of DN on hand function in stroke patient. In Group A who received DN with conventional therapy shows overall effectiveness after 3 weeks on ARAT and FMA with $p=0.000$ of ARAT and $p=0.000$ of FMA. This means that DN with conventional therapy is effective in improving hand function in stroke patient. There was significant improvement seen in the 4 components of ARAT that is grasp, grip, pinch and gross movement. Ansari, Feb 16, 2015 studied on DN for the treatment of the post stroke muscle weakness. The study explained that the improvement may be biomechanically through the changes occurring at the local level of muscle and connective tissue. Mechanical manipulation with the needle may disrupt the integrity of the soft tissue contracture locally, leading to release of resistance felt when stretching the weak muscle. The improvement in the upper limb functions indicate that there were also remote effects occurring with the DN. Thus as there is significant improvement seen in hand function of group A following DN with conventional therapy. Alternative hypothesis is accepted and null hypothesis is rejected. Second objective of the study was to find out the effect of Ultrasound as sham therapy with conventional therapy on hand function in stroke patient. In group B received Ultrasound with conventional therapy shows that there was not any significant effect on hand function as the ultrasound was used as a placebo effect for the patient. So null hypothesis is accepted and alternative hypothesis is rejected. Third objective of the study was to compare the effectiveness of DN and sham therapy on hand function in stroke patient. The result of this study was focused on improving hand function. In present study hand function has improved in group A following DN rather than group B following ultrasound. Thus the result of the study supported the alternative hypothesis that there is significant difference between the DN and sham therapy on the hand function in stroke patient. Improvement in the present study can be explained by the study done by Mariuez Druzbeck 2017 did analysis of study and concluded a positive benefit from using DN therapy for hand function in stroke patient. According to the hypothesis it is proven that DN is more effective in improving hand function in stroke patient when compared to ultrasound as sham therapy in stroke patients. Ainsley Rossi, studied on effectiveness of DN for weak muscle according to the study, there is potential mechanical effect of DN because DN of active points results into the local twitch responses on the contralateral as well as the treated side. Mechanical sensory stimulation following DN might trigger events both locally and centrally leading to neuro modulation of spasticity. Needling may cause pain to the stimulated nociceptors. The relaxing effect of the spastic muscle following DN could be related to activation of the noxious inhibitory control system. Thus DN is more effective when compared to sham therapy.

CONCLUSION: The present prospective case report showed that a Dry Needling to the weak hand function showed the great improvement in the hand function in stroke patients. Thus the results showed the significant effect of Dry Needling with conventional therapy compared to the Ultrasound as the Sham Therapy with conventional therapy. The main finding of this study is that the non active muscle showed the voluntary movements after DN therapy. Further study is needed to ascertain the effects of DN on motor recovery in patients with stroke.

ACKNOWLEDGEMENT: I sincerely want to thank our principal Dr. Chaitali Shah. I would like to admire my student Dr. Prexa Mistry for her dedicated work. I would owe this to our lovely parents and husband for their constant support care and motivation through their blessings. I express my thanks to all the staff members in parul institute of physiotherapy for their help and valuable suggestion.

REFERENCES

1. Research gate, Dec-2016; volume-39, issue:4.
2. Larry B. Goldstein, Methodist DeBakey cardiovascular journal, April-2014; Thomas Truelsen, Stephen Begg et al.; the global burden of cerebrovascular disease. 1 non communicable disease and mental health cluster, WHO Geneva 2000; volume-1
3. Riksstrokesarsrapport, Swedish- stroke rehabilitation, journal of Swedish stroke register; 2015. Available from: www.riksstroke.org.
4. SM. Hunter; spasticity after stroke, journal of reviews of clinical gerontology; 2008, volume-2.
5. WHO. World Health Report; journal of world Health Organization; 2003.
6. Schiemanck SK, Kwakkel G, Post MW, Keppelle Lj, predicting long term independency in activities of daily living after middle cerebral artery stroke; does information from MRI have added predictive value compared with clinical information. Stroke, 2006; 37: 1050-1054.

7. Veerbeek JM, Kwakkel G, Van Wegen EE. Early prediction of outcome of activities of daily living after stroke: a systematic review. *Stroke*, 2011; 42:1482-1488.
8. Robert Teasell, stroke recovery and rehabilitation. *Physical medicine and rehabilitation. Stroke*. 2003; 34:365-366.
9. Reynold's, American physiological study. *Stroke*. 2005;32.
10. Langhorne P, Coupar F, Pollock A. Motor recovery after stroke: a systematic review. *Lancet Neurol*. 2009; 8(8).
11. Prome, SM Hunter, hand function and stroke, *journal of reviews in clinical gerontology: volume 12 issue* : 2002, pp. 68-81.
12. Daniel Zondervall; hand functions for stroke, *journal of flint rehab*.
13. SungEun Lee, SungHyouonCho, *international journal of content: mar-2013 volume-9 issue-1*.
14. Owen Katalinic, Lisa Harvey, effectiveness of stretch on contracture; *journal of physical therapy, jan-2011: volume-91, issue-1*.
15. Kalichman L, Vulfsons, *journal of dry needling by a physical therapy*, 2010.
16. Calvo, Sandra; Quintero, *International journal of rehabilitation volume-10; issue:2*.
17. Tarasova M. Bartlova, *Journal of functional diagnostics and rehabilitation, oct-2008; vol-81; issue-3*.
18. Ansari NN, Dry needling for the effect of post stroke muscle spasticity, *Journal of neuro rehabilitation*, 2015; vol-49; issue-4.
19. Sandra Calva, Pablo Herrero, *International journal of rehab*, 2014, volume-24 issue-3.
20. Watanabe, role of physiotherapy in spasticity, *journal of physical medicine & rehabilitation: oct-2004- volume 83- issue-10*.
21. Effect of weight bearing exercise on upper- extremity activities, mar- 2013 volume-10; issue-2.
22. Steven L. effect of constraint induced therapy on upper extremity, 2006 volume-296 issue; 17
23. Mendigutia Gomez, effect of DN on spasticity *journal of physical therapy*, 2016 volume-37, issue;4.
24. Kuen-Horng TSAI, effects of a single session of prolonged muscle stretch on spastic muscle of stroke patients, *journal of department of industrial management*, 2001, volume-25, issue;2.
25. Thamar J. Bovend, *journal of arch phys med rehab*, july-2008, volume-89, issue-9.

