

Effect of Instrument Assisted Soft Tissue Mobilization Technique on The Trigger Finger Patients for Improving ADL's and Hand Function.

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ABSTRACT

Objective: To investigate the effect of IASTM technique on trigger finger patient for improving ADLs and hand function.

Background: There have been many studies done for the trigger finger patient using various technique like fascia release technique, stretching and electrical modalities.^[4] In previous studies augmented techniques use only for the reduce symptoms of trigger finger patient but in our study, we are doing IASTM technique use to improve patient ADLs and hand function.^[1]

Aim: Aim of this study is improve the hand function and ADLs also reduces the symptoms in minimal time duration.

Method: 16 Subjects aged Between 40 to 60 years, these subjects divided into two groups meeting the inclusion criteria were selected at and exclude the above 60-year age and various neurological disorders like stroke, seizure and cardiovascular disease, Treatment duration was 30 min per session for 2 months for 2 day per week.

Outcome Measure: DASH (Disability of the Arm, Shoulder, and Hand), Katz index of Independence in activities of daily living. QUINNELL grading and NPRS.

Result: The result of this study was show IASTM techniques is more effective in trigger finger patient for their ADL's and hand function, The P value <0.001. The result was high significant.

Conclusion: This study concludes that there is significant improvement in ADL'S and hand functions by intervention of instrumental assisted soft tissue mobilization technique on trigger finger patients.

Keywords: IASTM, Trigger finger, ADLs, Stretching, Ice therapy, Tendon.

INTRODUCTION

The Effect of IASTM technique on trigger finger patient for the improvement of ADLs and hand function this topic is study on the trigger finger patient, In previous research some study done related to my topic like various stretching method of tendon, augmented technique and braces use to recover the patient through the case series but our study focuses on the ADLs and the hand function of the patient by the use IASTM technique.^[3]

The lifetime risk of developing of the trigger finger is approx. estimated to be between the 2% to 3% but it develops 10% risk in the diabetic patient. Trigger finger also known as stenosing tenosynovitis, trigger finger

happens when the tendon and its protective sheath which around the fingers and finger swell up or thicken. The swelling makes harder and finger not smoothly, affected finger not move easily due to the abnormalities in the tendon that leads to “freeze” them in a flexed position^[5] Tendon are band of tissue that attach muscles to bones, pulley is the anatomical structure that present in the finger that allow smoothly movement of the tendon, there are 5 annular pulleys (A1-A5) and three crucial pulleys in each finger. In the trigger finger tendon swell with develop the nodules in the tendon these nodules restrict the movement because the nodules’ part not pass to the pulley, In TF patient feel locking, morning stiffness, tenderness and pain this symptom aggravating according to the condition and stages^[7] TF is usually classified as a idiopathic condition but some other etiology hypothesis was proposed. It has been postulated that this disorder is caused by high pressure at the proximal edge of the A1 pulley and the discrepancy between the diameter of the flexor and its sheath at a metacarpal head^[6]

In previous research use the GRASTON technique on the trigger finger patient by the conducting of case study, but we will apply the AUGMENTED technique on the group of TF patient through the various method. This technique is come under the Instrument assisted soft tissue mobilization (IASTM). IASTM is a MYOFASCIAL intervention used for the soft tissue treatment. This technique based on the principle of JAMES CYRIAX cross-friction massage^[4] There is four types of IASTM technique, Fascia abrasion technique, Graston technique, Augmented Soft Tissue mobilization and Sound assisted soft tissue mobilization. The IASTM therapy is encourage the collagen production in addition to fibroblast-recruited healing by desorbing excess fibroses from connective tissues. Benefits of instrument assisted soft tissue mobilization are reduce pain and promote blood flow and lymphatic drainage to reduce swelling, decrease muscles spasm, decrease muscle tightness, reduce scar tissue formation, and stimulate tissue healing^[1] IASTM have neurophysiologic effect it stimulates mechano-sensitive neurons include discrimination and mechano-nociceptor which are responsible for pain perception and it increase the blood flow by the change in the vascular by the vasodilatation of the vessels around the injured site. It minimizes and breakdown of the adhesion and the excess collagen in the tendon of the finger, these all mechanism is occurred during the applying of this therapy^[2]

Trigger finger occurred in the commonly in ring finger and thumb however, the condition can affect any of the digit. Flexor digitorum superficialis (FDS) tendon help to flex the finger and also metacarpophalangeal joint is involved in this condition because A1 pulley is present at the metacarpophalangeal joint of the finger so these all-anatomical part abnormalities progressively cause the develop the nodules in the tendon that leads to locking or stiff in the joint^[3]

Need of Study

In previous research various studies are done on the trigger finger patient but only GRASTON method that related to IASTM technique are use on that patient that’s all conduct through the case research study and also use of different manual therapy with splinting for the minimize patient symptoms^[1]

Singnificance of Study

This study is helpful for the awareness of the society and community member to know about the IASTM tools that use to improving the daily routine task activities and ADL’s and live the independently^[5] Patient who suffers from this condition with the feel like related to TF symptoms then they visit to the therapist for the Applying of this IASTM therapy^[4]

Aim of Study

The aim of this study to find the effectiveness of IASTM therapy on the trigger finger patients for improves of patients ADL’s and their hand function.

Objective of Study

To find the effect of IASTM therapy on the trigger finger patient for the improvement of ADL’s and hand function.

Hypothesis

NULL HYPOTHESIS (Ho) –There will be no significant effect of Instrument Assisted soft tissue mobilization technique in trigger finger patients for the ADLs and hand function
ALTERNATIVE HYPOTHESIS (H1) - There will be significant effect of Instrument Assisted soft tissue mobilization technique in trigger finger patients for the ADLs and hand function.

METHOD AND MATERIALS

Study Design - Experimental study

Study Setting – (multi setting) Orthopedics hospitals and physiotherapy out-patient department.

Population –The targeted population of the study were the trigger finger patient in Jamuhar NMCH and Daud Nagar. Participants were selected into this study through the convenience which is non probability sampling. Sample size was 16 and these sample size divided into two group (08 sample size in each group) Population took from various following hospitals and OPD's these are: - NARAYAN MEDICAL COLLEGE AND HOSPITAL (JAMUHAR).

Sampling – Convenience sampling.

Selection Criteria: -(INCLUSION CRITERIA):

- Trigger finger patient both diabetic and non-diabetics.
- Both male and female patient.
- Age between 40 to 60 yrs.
- Only English language is conducted in our study.
- Stage 1, 2 and 3 available in the QUINNELL grading system.

(EXCLUSION CRITERIA):

- Age above 60 years.

Cardiovascular disease like hypertension and some neurological condition like stroke and seizure.

- DASH score should not exceed 80.
- QUINNELL grading should not be 0 and 4.

INSTRUMENTS AND TOOLS

- IASTM tools
- Aqueous gel
- Ice pack
- Towel
- A new jar or bottle
- Key& lock

- Frying pan
- Any heavy object
- Knife and food materials
- Pen and paper
- OUTCOME MEASSURES
- DASH (Disabilities of the Arm, Shoulder, and Hand)
- KATZ index of independence in activities of daily living.
- QUINNELL grading system for trigger finger
- NPRS (Numerical pain rating scale)
- Procedures

Total 16 trigger finger patients were selected for study from the different areas and hospitals and OPD's of NARAYAN MEDIAL COLLEGE AND HOPITALS using convenient sampling method. Divide the 16 patients in two groups (08 patients in each group) these all patients are selected by the proper inclusion and exclusion criteria of the study. Consent form was provided to every patient.

Give only conservative treatment like Ice pack, ultrasound therapy, manual stretching and strengthening exercise for Group A and give all conservative with use of IASTM therapy for the group B. Our treatment duration is approx. 2 months continuous. Treatment duration was 30 min for a session 2 day per week and treatment is done 2 times in a day for both groups. Some measurement scale is use to assess the patient for the knowing the scoring of the scale like DASH (disability of arm shoulder and hand), MHQ, NPRS, KATZ INDEX of independence in activities of daily living (ADL's) And QUINNELL grading system all these outcome measure use before the starting of the treatment and after the treatment score , in the DASH noted the scoring of the patient by the performing of some tasks like open a tight or new jar , write, turn a key , prepare a meal, push open a heavy door, place an object on a self above your head, do heavy household chores, make a bed, carry a shopping bag or brief case, etc. these all 30 task done by the instruction of therapist and score by the formula of DASH. I am KATZ index of independence in activities of daily living (ADL's) scoring is noted by the doing various task by the patient to performing some content related to the bathing, dressing, toileting, transferring, continence and feeding. Check the all-outcome measure and compare both the score before and after the treatment and know the effectiveness of IASTM techniques on the trigger finger patient for the both groups of patients.

The treatment protocol for both groups: -

GROUP A – (CONSERVATIVE TREATMENT ONLY): -The patients in this group received treatment for 30 min. per treatment session for 2 months for 2 day per week.

The treatment protocol consists: -

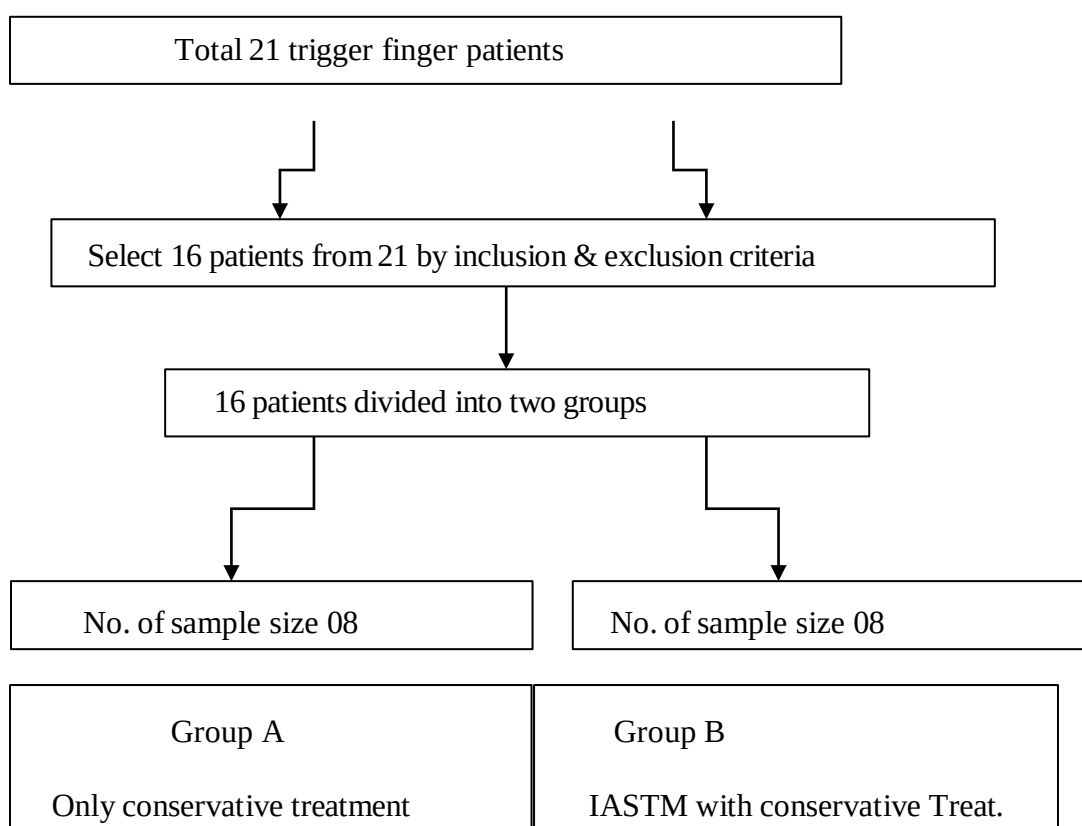
1. Apply the ice pack on the hand for reducing pain and inflammation (for 5 min.)
2. Manual stretching in fingers and forearm (for 10 min.)
3. Ultrasound therapy on the wrist and finger (for 8 min.)
4. Wrist and finger strengthening exercise (for 7 min.)

5. Kinesio taping apply at one time a day

Group B (Conservative With Iastm Techniques): -The patients in this group treatment for 30 min. per treatment session for 2 months for 2 day per week. The treatment protocol consists: -

1. Apply the ice pack on the hand for reducing pain and inflammation (for 5 min.)
2. Ultrasound therapy on the wrist and finger (for 5 min.)
3. Instrument Assisted Soft Tissue Mobilization Techniques (for 15 min.)
4. Wrist and finger strengthening and stretching exercise (for 5 min.)
5. Kinesio taping apply at one time a day

Flw Chart



Statistical Tools

Data analysis was carried out using SPSS software after collecting all outcome measures in both groups.

The following were the statistical formulas which are applied for result.

- Mean
- Standard deviation
- Paired-t-test
- Independence-t test

Formula of data analysis-

Mean- It gives the average value of whole range of data given. Its value is calculated when adding whole items together and then divided by total number of items.

$$A = \frac{1}{n} \times \sum_{i=1}^n x$$

A = Average

N = number of items

Xi = value of each individual items in the list of number being averaged

$$s = \sqrt{\frac{\sum (x - \bar{x})^2}{n - 1}}$$

Standard deviation – It is used to measure the variation in set of data values.

X = each value in the population

$$t = \frac{\bar{X} - \mu}{s / \sqrt{n}}$$

n-1 = number of values in sample minus 1

Paired-t test - It used to compare the means between two related groups on the same continuous, dependent variable.

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{s^2 \left(\frac{1}{n_1} + \frac{1}{n_2} \right)}}$$

Unpaired t-test – This is used to test the null hypothesis when population mean related to two independence random samples. Random samples from a normal distribution are equal.

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

Data Analysis And Result

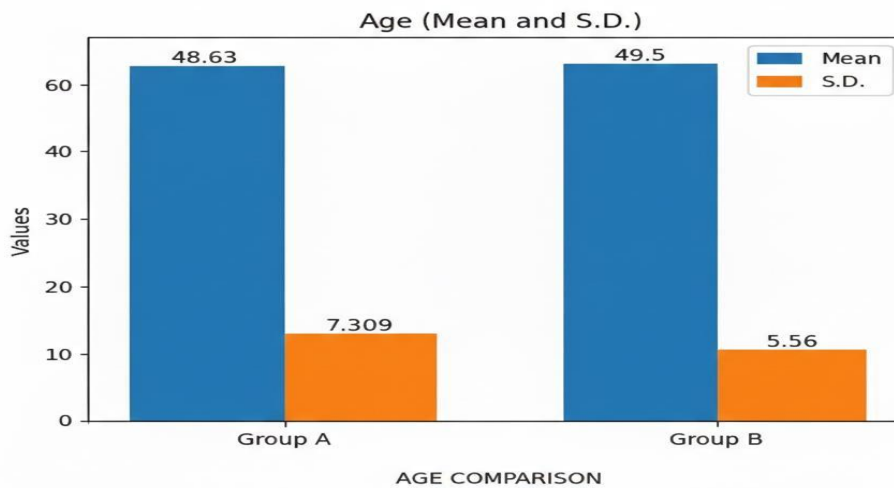
SR. NO.	AGE	GENDER	AFFECTED HAND
1.	55	F	LEFT
2.	41	M	LEFT
3.	40	M	RIGHT
4.	55	M	LEFT
5.	45	F	RIGHT
6.	58	M	RIGHT
7.	42	F	LEFT
8.	53	M	LEFT
9.	50	M	RIGHT
10.	50	F	LEFT
11.	45	F	LEFT
12.	58	M	RIGHT
13.	47	M	RIGHT
14.	52	M	LEFT
15.	54	F	RIGHT
16.	40	M	RIGHT

RESULT

Unpaired t-test for mean age between two groups.

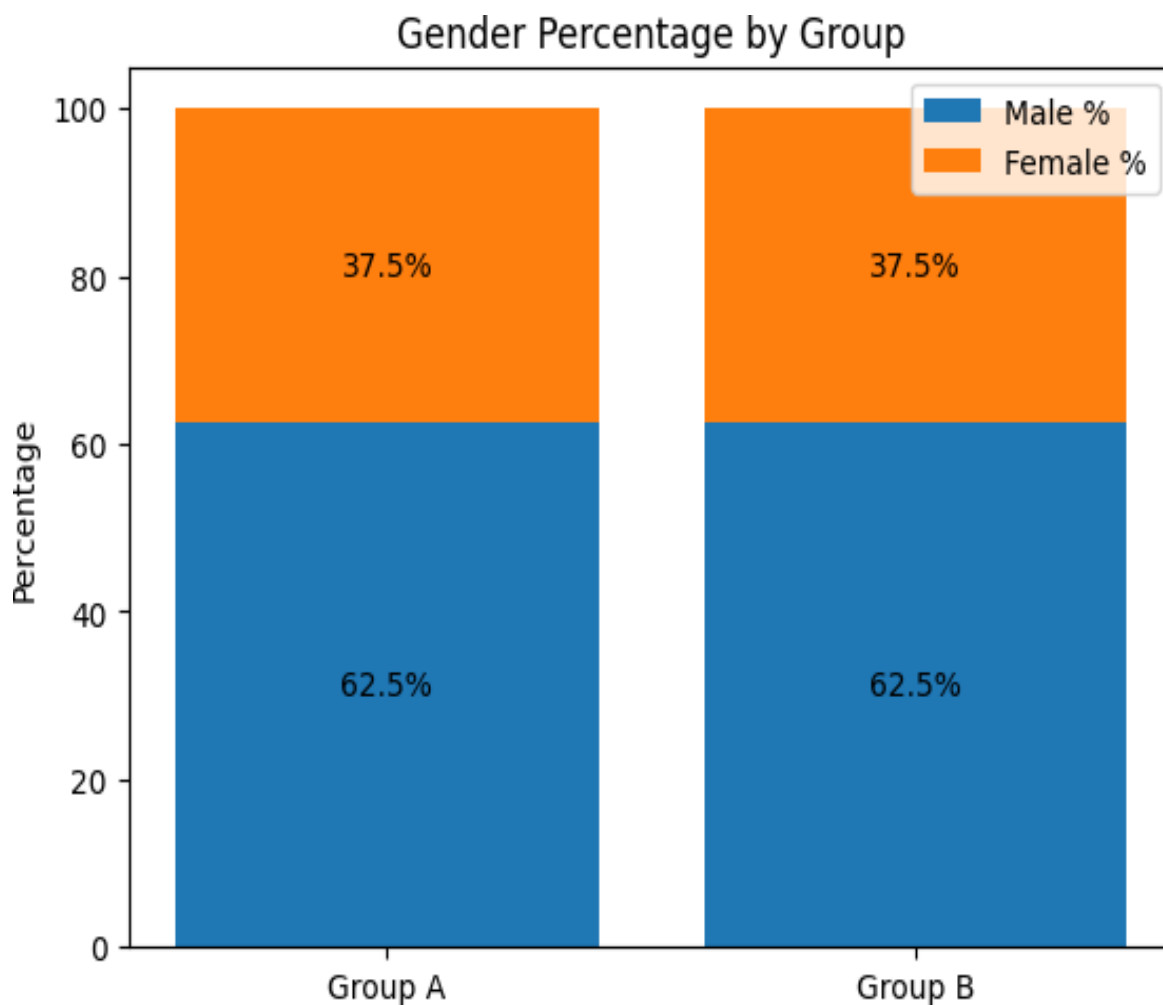
Unpaired T test	Comparison	
	AGE	
	Group A	Group B
Mean	48.63	49.5
S.D.	7.35	5. 56
Number	08	08
Mean Difference	-0.87	
Unpaired T test	0.27	
P value	0.792	
Table value at 0.05	2.15	
Result	Not-Significant	

Comparison of mean and SD of subjects age between group A and B was done. The mean and standard deviation of group A 48.63, SD 7.35 and group B 49.5, SD 5.56. The P value 0.792 ($P>0.05$). There was no significant difference in mean age between the two groups.



Unpaired t-test for mean gender between two groups.

Group	Group A	Group B
Male (f)	5	5
Female (f)	3	3
Group	Group A	Group B
Male (%)	62.5%	62.5%
Female (%)	37.5%	37.5%

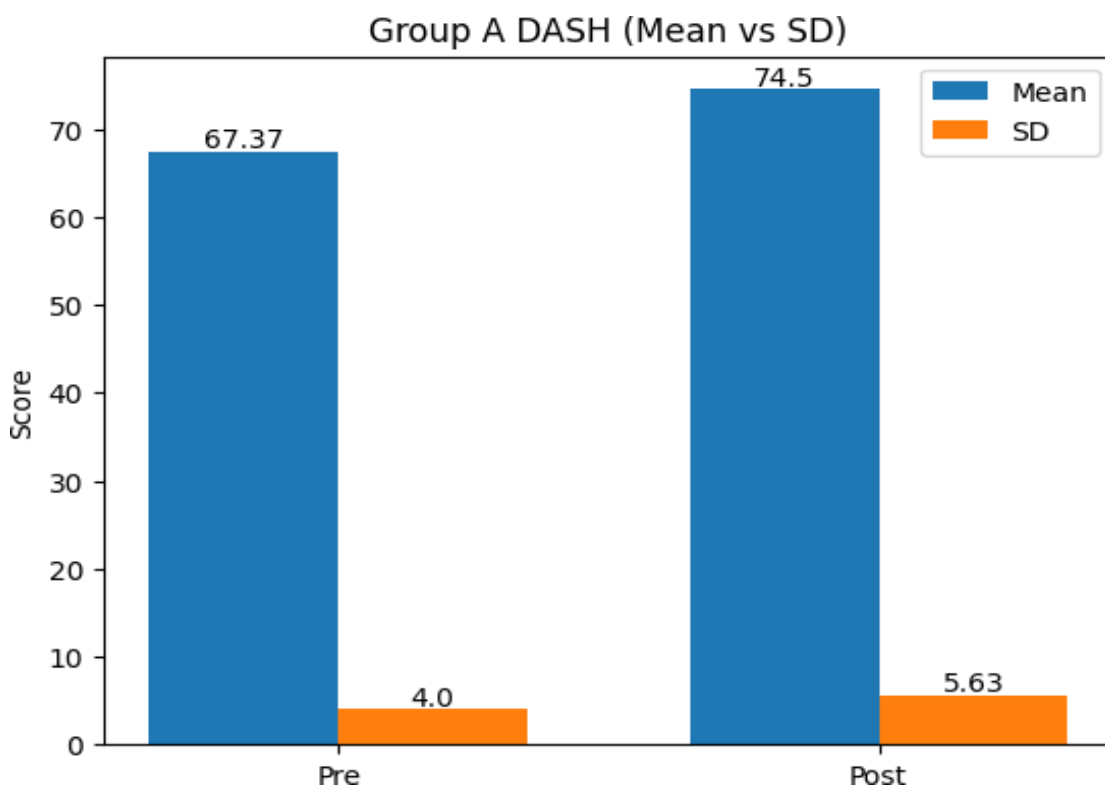


Within Group Comparison

Comparison of mean in DASH within group A by paired-t test

Paired T test	Group A	
	DASH	
Duration	Pre	Post
Mean	67.37	74.5
S.D.	4.00	5.63
Number	8	8
Mean Difference	-7.13	
Paired T test	4.10	
P value	0.004	
Table value at 0.05	2.365	
Result	Significant	

Comparison of mean and SD of DASH within group A was done according to its pre and post treatment readings. The mean and SD of before treatment was 67.37, SD 4.00 and after treatment was 74.5, SD 5.63. Mean difference was -7.13. The P value <0.004. The result was significant.



Within Group Comparison

Comparison of mean in DASH within group B by paired-t test

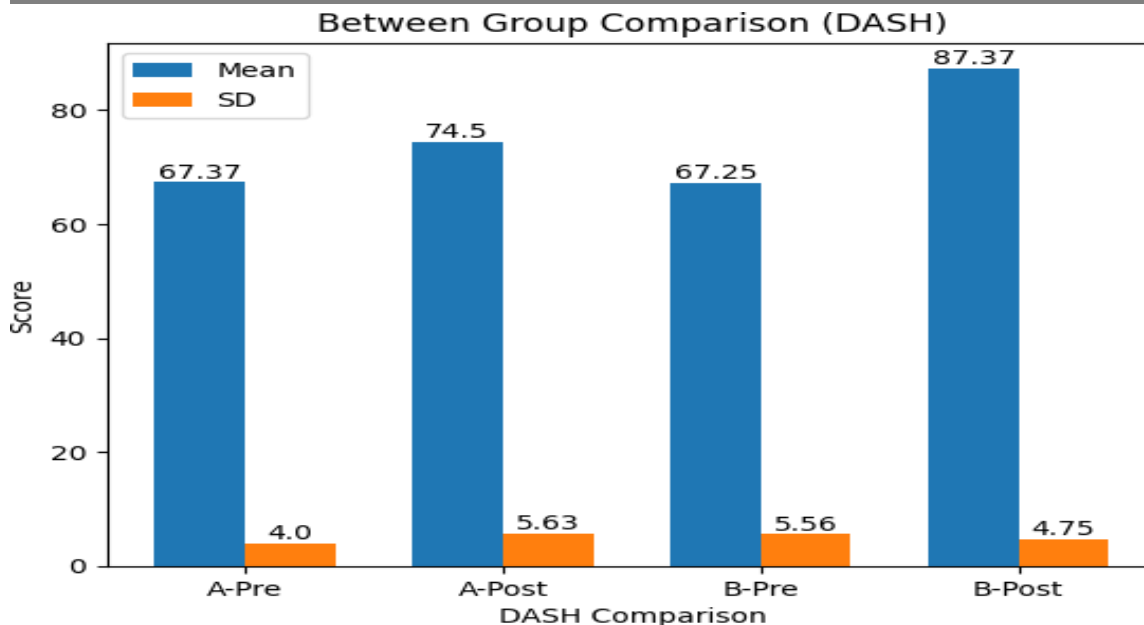
Paired T test	Group B	
	DASH	
Duration	Pre	Post
Mean	67.25	87.37
S.D.	5.56	4.75
Number	8	8
Mean Difference	-20.12	
Paired T test	10.99	
P value	0.001	
Table value at 0.05	2.365	
Result	High significant	

Comparison of mean and SD of DASH within group A was done according to its pre and post treatment readings. The mean and SD of before treatment was 67.25+, SD 5.56 and after treatment was 87.37, SD 4.75. Mean difference was -20.12. The P value <0.001. The result was high significant.

Between Group Comparison

Comparison in DASH between group A and B by Unpaired-t test.

Paired T test	Group A		Group B	
	DASH		DASH	
Duration	Pre	Post	Pre	Post
Mean	67.37	74.5	67.25	87.37
S.D.	4.00	5.63	5.56	4.75
Number	8	8	8	8
Mean Difference	-7.13		-20.12	
Paired T test	4.10		10.99	
P value	0.004		0.001	
Table value at 0.05	2.365		2.365	
Result	Significant		High significant	



DISCUSSION

In Trigger finger patients ADL's and Hand function impairment is one of the major issues. Many advanced approaches have been used to reduce these impairments. In this study, our aim was to reduce the hand impairment and hand function in trigger finger patients by the use of IASTM techniques and other conservative treatment protocol to reduce the impairment in finger, and improve the ADL's^[8] This technique based on the principle of JAMES CYRIAX cross-friction massage.

Our study based on comparing the both group by the using conservative and IASTM techniques intervention in trigger finger patients were selected approx. 16 subjects on the basis of exclusion and inclusion criteria. Sample size was calculated according to the incidence rate of trigger finger cases mention in the previous studies. Whole study was done in jamuhar, Sasaram and Daudnagar city. Consent form was taken from patients before giving the treatment. This form was in both Hindi and English language. Duration of the study was 30 min per session for 2 months for 2 day per week^[9]

In baseline data more male patents compare to female patients with paired t test in within group comparison, result was significant in DASH score after the applying treatment due to effectiveness in pre to post and also in group B.

With unpaired-t test in between group comparisons in both groups, result was significant in group A but in group B was high significant for the both group of post DASH scoring.

So according to result, Instrumental assisted soft tissue mobilization techniques is effective in trigger finger patient for the reduce impairment of hand and improving ADL's activities because result is high significant in group B patient by the use of outcome measures.

Limitations

Sample size was small because of lack of availability of patients. Another limitation was lack of feasibility to work with the patient. Previously very fewer studies have been done on the IASTM intervention for trigger patients, so literature was very less for this phase. Another limitation is comparing both diabetics and non-diabetics.

CONCLUSION

The result of this study concludes that there is significant improvement in ADL'S and hand functions by intervention of instrumental assisted soft tissue mobilization technique on trigger finger patients.

Future Scope

In future the studies, a randomize controlled can be done on this with large small size. In a study to see effectiveness of ADL's and Hand function as well as recovery done in minimal time duration.

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