



A COMPARATIVE STUDY OF LOW-LEVEL LASER THERAPY VERSUS KINESIO-TAPING ON PAIN AND FUNCTIONAL DISABILITY IN PATIENTS WITH DE-QUERVAIN'S TENOSYNOVITIS.

Physiotherapy & Rehabilitation

Dr. Gurbans Gill Assistant Professor, Dasmesh College of Physiotherapy, Faridkot

Dr. Shivam Monga Assistant Professor, Dasmesh College of Physiotherapy, Faridkot

Dr. Musawir Mohsin Parsa PG Student, Centre for Physiotherapy and Rehabilitation Sciences, Jamia Millia Islamia, New Delhi

Kanika UG Student, Dasmesh College of Physiotherapy, Faridkot

ABSTRACT

Introduction: De-Quervain's Tenosynovitis is a painful condition caused by the entrapment of tendons at the wrist, leading to impaired functionality. This study compares the effectiveness of Low-Level Laser Therapy (LLLT) and Kinesio Taping (KT), both combined with Hot Pack (HP), in alleviating pain and improving functionality. **Methodology:** A total of 60 patients aged 20–40 years were randomly assigned into three groups: Group A (LLLT + HP), Group B (KT + HP), and Group C (HP only). Treatments were administered three times weekly for four weeks. Pain and functionality were measured using the Visual Analogue Scale (VAS) and Lateral Pincer Grip Strength Scale. Data was analysed using t-tests and ANOVA. **Results:** All groups showed significant improvement in pain and functionality. Group B demonstrated superior results in reducing pain and improving grip strength compared to Groups A and C. **Conclusion:** Kinesio Taping combined with Hot Pack is a more effective and patient-friendly treatment for De-Quervain's Tenosynovitis than LLLT or HP alone. These findings highlight the importance of tailored physiotherapy regimens for optimal management of De-Quervain's Tenosynovitis.

KEYWORDS

De-Quervain's Tenosynovitis, Kinesio Taping, Low-Level Laser Therapy, Hot Pack, Visual Analogue Scale, Grip Strength.

INTRODUCTION

De-Quervain's Tenosynovitis is a chronic inflammatory condition characterized by pain and restricted thumb movement. [1] De-Quervain's syndrome involves non inflammatory thickening of the tendons and the synovial sheaths that the tendons run through. [2] The two tendons concerned are those of the extensor pollicis brevis (EPB) and abductor pollicis longus muscles (EPL). These two muscles run side by side and function to bring the thumb away from the hand (radial abduction). De-Quervain's tendinopathy affects the tendons of these muscles as they pass from the forearm into the hand via a fibro-osseous tunnel (the first dorsal compartment). [3]

Traditional treatments include splints, corticosteroid injections, and physical therapy. Emerging modalities like LLLT and KT have gained traction due to their non-invasive and patient-centric approaches. [4], [5]

To the best of our knowledge, there is limited study about the use of LLLT in De-Quervain's syndrome. This study aims to compare the efficacy of these modalities, both in conjunction with HP, to provide evidence-based guidance for effective management.

We hypothesized that low level laser therapy along with hot fermentation treatment will have a significant effect on reducing pain and improving range of motion compared to other interventions.

Methodology

The study was conducted at the Outpatient Department (OPD) of Dasmesh College of Physiotherapy, Faridkot. Sixty participants aged between 20-40 years diagnosed with De-Quervain's tenosynovitis were enrolled in this study. The participants were purposefully selected. The sample size was calculated using G* Power as in previous study with alpha value of 0.05. A total sample size of 60 was required (20 in each group) was required. The following inclusion criteria were applied: (1) Individuals aged 20-40 years (2) Both male and female (3) Finkelstein test positive (4) History of pain around dominated thumb (5) limitation of thumb movement due to pain, diagnosed by an experienced physiotherapist. The exclusion criteria were (1) Arthritic conditions like Rheumatoid arthritis etc. (2) Recent trauma or fractures of hand (3) Any malignancy (4) subjects who are not willing to participate in the study (6) or subjects with any other neurological or cardiovascular disorder. Before randomized allotment of the subjects, socio- descriptive data was collected. Then, 60 participants were randomly assigned by a blinded researcher. Sixty participants were randomly assigned into one of the three treatment groups as follows: Group A (n=20), Group B (n= 20), Group C (n=20). All the participants provided written informed consent to participate in the study.

Procedure

The present study was a three-group study with exercise interventions in the Group A and Group B while the Group C is control Group. A pre and post-test was applied. The following outcome measures were used in the study:

Visual Analogue Scale (VAS): Severity of pain was assessed using visual analogue scale. It consists of 10 cm long scale ranging 0 (no pain) to 10 (the worst pain possible). [6]

Lateral Pincer Grip Strength Using Thumb Dynamometer: The lateral pincer grip strength test evaluates the strength and precision of the thumb and index finger, specifically focusing on their ability to pinch objects between the pads. It involves the thumb and index finger to exert pressure on hand held thumb dynamometer.

Intervention: The Participants were randomly divided into three groups (Group A: subjects treated with Low level laser therapy along with Hot fermentation, Group B: subjects were treated with Kinesio-taping along with hot fermentation while Group C (Control group): given only hot fermentation). A hot fermentation maintained at a temperature of 140–160 Fahrenheit for 15 minutes were applied to subjects in all the three groups. A total of 12 treatment sessions were given 3 times a week.

Group A: Group A was treated with low level laser therapy and hot fermentation. A Gal-Al-As diode laser appliance was used with a power output of 100 mw and the wavelength of 830 nm. The laser therapy was applied with 0.60 joules per minute with scanning method for total duration of 5 minutes. A total of 12 treatment sessions were given 3 times a week.

Group B: Group B was treated with Kinesio-taping and hot fermentation for 3 days per week for 12 weeks. Two tapes were used for Kinesio-taping. The first one was applied with 85% stretch with the wrist in ulnar deviation and first metacarpophalangeal joint in flexion position. The other tape was applied to cover the first extensor compartment. The first tape is intended to provide mechanical support to the Adductor pollicis longus (APL) and Extensor pollicis brevis (EPB) tendons, while the second tape is intended to demonstrate anti-inflammatory effect.

Group C: Group C was control group given only hot fermentation maintained at a temperature of 140–160 Fahrenheit for 15 minutes. A total of 12 treatment sessions were given 3 times a week.

Data Analysis: Statistical analyses were performed using SPSS software. Tests included paired t-tests, unpaired t-tests, and ANOVA to compare pre- and post-intervention outcomes.

RESULTS

Baseline Demographic Details of the participants shows that mean age of participants was 30.35 years. Group A and B had 40% females, and Group C had 55% females. There was no significant difference between the groups in the pre-test stage in terms of demographic and clinical variables ($P > 0.05$)

Overall, there was significant improvement between the baseline and 4 weeks for all the groups. There was a significant difference in the mean scores of Neck disability Index (-6.60) and Pain (-1.55). Group A results were significantly better than Groups B and C ($p < 0.05$) whereas Group B showed a statistically significant improvement over Group C ($p < 0.05$).

Table 1: Demographic Data Of Patients With De-quervain's Tenosynovitis.

Characteristics	Group A (n=20)	Group B (n=20)	Group C (n=20)
Age (years)	30.35 \pm 5.58	30.55 \pm 5.46	30.90 \pm 6.35

Table 2: Pre And Post-test Comparisons Of The Outcomes Assessed In The Study And Between Groups.

Dependent variables	Group	Baseline mean \pm SD	Post 4week mean \pm SD	Mean Difference	Δ Pre- Post
VAS	Group A	6.15 \pm 1.22	2.80 \pm 0.95	3.35	\downarrow 54%
	Group B	6.10 \pm 1.37	1.80 \pm 0.61	4.30	\downarrow 70%
	Group C	6.20 \pm 1.28	4.65 \pm 1.22	1.55	\downarrow 25%
GRIP STRENGTH	Group A	7.96 \pm 1.03	15.37 \pm 1.52	-7.41	\uparrow 93%
	Group B	7.83 \pm 1.18	15.53 \pm 1.80	-7.70	\uparrow 98%
	Group C	7.74 \pm 1.15	14.20 \pm 1.64	-6.46	\uparrow 84%

Table 3: ANOVA Comparison Of Pre And Post Treatment Of VAS Score Between Group A, Group B and Group C.

ANOVA	VAS					
	GROUP A	VAS PRE GROUP B	GROUP C	VAS POST GROUP A	GROUP B	GROUP C
MEAN	6.15	6.10	6.20	2.80	1.80	4.65
S.D	1.225	1.372	1.281	0.951	0.615	1.225
NUMBER	20	20	20	20	20	20
MAX	8	8	8	5	3	7
MIN	4	4	4	1	1	2
DI		59			59	
F-TEST		0.030			45.015	
P-VALUE		0.971			<0.001	
RESULT		Not-Significant			Significant	
TURKEY'S METHOD pairwise com.	v/s B	v/s C	v/s A	v/s B	v/s C	v/s A
Result with mean diff.	0.05 N/Sig.	0.10 N/Sig.	0.05 N/Sig.	1.00 Sig.	2.85 Sig.	1.85 Sig.

Table 3: ANOVA Comparison Of Pre And Post Treatment Of GRIP STRENGTH Score Between Group A, Group B and Group C.

ANOVA	GRIP STRENGTH					
	GROUP A	GRIP STRENGTH PRE GROUP B	GROUP C	GRIP STRENGTH POST GROUP A	GROUP B	GROUP C
MEAN	7.960	7.830	7.745	15.375	16.615	14.205
S.D	1.039	1.184	1.153	1.521	1.803	1.645
NUMBER	20	20	20	20	20	20
MAX	9.8	9.7	9.8	18	18.6	15.9
MIN	6.1	5.8	5.6	12.6	13.7	12
DI		59			59	
F-TEST		0.184			10.532	
P-VALUE		0.832			<0.001	
RESULT		Not-Significant			Significant	
TURKEY'S METHOD pairwise com.	v/s B	v/s C	v/s A	v/s B	v/s C	v/s A
Result with mean diff.	0.13 N/Sig.	0.085 N/Sig.	0.215 N/Sig.	1.24 Sig.	2.41 Sig.	1.17 Sig.

DISCUSSION

This study highlights the efficacy of Low-level laser therapy given along with hot fermentation when compared to the Kinesio-taping given along with hot fermentation in improving the functional performance of the patients with De-Quervain's Tenosynovitis. The results showed that Kinesio-taping when given along with hot fermentation is more effective in improving pain and range of motion in patients with De- Quervain's Tenosynovitis than Low level laser therapy given along with hot fermentation.

The findings align Bassett et al. with Therapeutic benefits of KT application to injured tissues are described in these ways: For concentric facilitation, we should apply KT from the muscle origin to the insertion which increases muscle contraction. To facilitate an eccentric or diminished contraction, applying KT from the insertion to the origin is suggested. An assumption has also been made that decreasing the interstitial pressure also decompresses subcutaneous nociceptors leading to decreased pain. Another theory is gate control

theory of pain in which afferent mechanoreceptor signals from KT to the brain down regulate nociceptive input because of skin lifting. [8]

However, the control group receiving only Hot Fermentation which demonstrated limited improvement, underscoring the need for some more intervention in rehabilitation programs.

CONCLUSION

Based on our study though all the three groups showed significant reduction in pain, disability and other symptom severity, but Group B shows more improvement in functional status and symptom severity as compared to Group A and Group C. Hence, alternate hypothesis is accepted and null hypothesis is rejected.

Thus, we conclude that Kinesio Taping along with hot pack showed better and faster results as compared to Low Level Laser Therapy given along with hot pack or hot pack alone. Kinesio Taping and hot pack were well tolerated by the patient and showed no side effects.

Thus, the study proposes that although all three groups were benefitted from the treatment given but Group B showed better and significant results than Group A, followed by Group C.

Limitations:

1. Small sample size.
2. Focus on a specific age group (20-40 years).
3. Lack of consideration for external factors like obesity affecting the progress cannot be controlled.
4. Emotional and environmental factors were not considered.
5. Ergonomical advice and posture correction not employed.

Future Scope

1. treatment follow-ups after four weeks can be taken.
2. Similar study could be used to establish the effectiveness of low-level laser and Kinesio-taping on the other conditions.
3. Investigating other exercise modalities for neck pain management.

REFERENCES

1. Peters-Veluthamaningal C, Winters JC, Groenier KH, MeyboomdeJong B (2009). Randomized6444ed controlled trial of local corticosteroid injections for De-Quervain's tenosynovitis in general practice. BMC Musculoskeletal Disorder;10:131.
2. Clarke MT, Lyall HA, Grant JW, Matthewson MH (December 1998). "The histopathology of De-Quervain's disease". J Hand Surg Br. 23 (6): 732-4.
3. Read HS, Hooper G, Davie R (2000). "Histological appearances in post-partum De-Quervain's disease". J Hand Surg Br. 25 (1): 70-2.
4. Weiss AP, Akelman E, Tabatabai M (1994). Treatment of De-Quervain's disease. J Hand Surg Am;19:595-8.
5. Tsai HJ, Hung HC, Yang JL, Huang CS, Tsauo JY (2009). Could Kinesio tape replace the bandage in Decongestive lymphatic therapy for breast cancer-related lymphedema? A pilot study. Support Care Cancer;17:1353-60.
6. P E Bijur, W Silver, E J Gallaher (2001) Reliability and validity of visual analogue scale for measurement of acute pain. Acad Emerg Med, 8(12): 1153-7.
7. Katia F, Daniel B, Gina B, Josee A, Patrick H, Denis G (2006) Reliability and validity of pinch and thumb strength measurements in De-Quervain's disease. 19(1):2-10. Doi:10.1197/j.jht.2005.10.002.
8. Bassett KT, Lingman SA, Ellis RF (2010). The use and treatment efficacy of kinesiotherapeutic taping for musculoskeletal conditions: A systematic review. NZ J Physiotherapy 38(2):56-62.