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A New Physiotherapeutic Approach On Alleviating Physical Ailments Of Lateral Epicondylalgia

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Abstract

Introduction: Tennis elbow medically known as Lateral epicondylitis is inflammation of the lateral epicondyle at common extensor origin. There is a wide spectrum of treatment modalities in lateral epicondylitis including drug therapy, non-electrotherapeutical treatments, acupuncture, electrotherapeutical treatments and surgery. The present study was conducted with an aim to compare the effect of HVLAT on various physical dimensions in lateral epicondylalgia among male and female population of various occupations.

Methodology: The enrolled subjects (n=160) were randomly divided into two groups, group A (experimental, n= 80) and group B (control, n=80) by computerized randomization. The experimental group subjects were given three sessions of High Velocity Low Amplitude Thrust (HVLAT) single thrust at elbow on alternate days. The control group subjects were given Conventional Physiotherapy.to assess whether there is a difference on the effect of HVLAT among male, female and various occupations, the experimental group was further clustered.

Results: The results were calculated using paired t test to find the effect of HVLAT on pain and Hand grip strength by Paired t test within the groups and unpaired t test among the groups.

Conclusion:

Based on the results of the study it is concluded that HVLAT is beneficial in improving hand grip strength, functional independence and alleviating pain in patient with Lateral Epicondylalgia irrespective of gender or occupation.

I. INTRODUCTION

The word Lateral Epicondylalgia was first reported in the Lanset in 1882 by Henry Morris[1] It is the pain and tenderness over the bony prominence of lateral epicondyle. Evidences show that there is degenerative changes within the common origin of long extensor tendons for the forearm and hand[2] . The symptoms may vary from slight tenderness to severe which are elicited and exacerbated by resisted extension of the middle finger or wrist. The most common risk group is found to be tennis players but also found common among college students and housewives[3]. There is no known evidence between the association of gender and epicondylitis. Some studies shown that women are at high risk than men[4,5,6]. There are contradictory findings in the previous researches reporting the association between work related physical factors and epicondylitis[7,8,9]. Tennis elbow can cause a great social and economic burden from weeks to months[10]. Inspite of advances in the treatment of Lateral Epicondylalgia there is still lacunae in established standards[11]. The common treatment available with evidence of significance are corticosteroids[12], physiotherapy[13,14], Anti-inflammatory medications[14], orthotic supports[15], acupuncture[16] and surgery[17]. The trending options of management of lateral epicondylalgia include autologous blood injections (ABI)[16], platelet rich plasma (PRP) injections[18].

Since ages Physiotherapy was considered as a safe and productive means of management of lateral epicondylalgia. The conventional physiotherapy includes friction massage, ultrasound therapy, thermotherapy and exercises[19]. Extracorporeal shock therapy is the trending option for lateral epicondylalgia nowadays[20]. Even though multifarious options available, evidence based researche is meagre.

After a thorough review of literature we found that there are research gaps in the prevalence of lateral epicondylalgia among different occupations, gender based recovery, and role of high velocity low amplitude thrust (HVLAT) which is a novel option on the physical dimensions of recovery in lateral epicondylalgia.

II. AIMS AND OBJECTIVES

- To evaluate the role of high velocity low amplitude thrust (HVLAT) on the physical dimensions of recovery in lateral epicondylalgia.
- To identify whether there is a gender difference on recovery after the management by high velocity low amplitude thrust (HVLAT).
- To explore the prevalence of Lateral Epicondylalgia among different occupations.

- To explore the effects of HVLAT on various physical dimensions of recovery among different occupations.

III. MATERIALS AND METHODS

The study was conducted at physiotherapy OPD of Uttar Pradesh University of Medical Sciences, Saifai, Etawah, U.P and Era University, Lucknow. The study got ethical approval from Era University, Lucknow, Reg.no: ECR/717/inst/UP/2015/RR-21 and the trail is registered with CTRI, Reg.no: CTRI/2021/11/038156. The study was conducted for a period of two years. A total of 280 subjects attending Physiotherapy or Orthopaedics OPD with chief complaint of pain over the lateral epicondyle were screened for eligibility for recruiting in the study.

160 subjects satisfied inclusion criteria and were enrolled in the study. Both male and female subjects with the complain of local tenderness over the lateral epicondyle, pain on gripping, resisted wrist movements with elbow extension, a positive Cozen's and Mill's test were included in the study.

Both male and female subjects with any other explanation of the pain around elbow, comorbidity that adversely affect prognosis, no consent and presence of any contraindication for the method of treatment were excluded from the study. The enrolled subjects (n=160) were randomly divided into two groups, group A (experimental, n= 80) and group B (control, n=80) by computerized randomization after taking written consent to participate in the study. It is a single blinded study, where the subjects were blinded.

Experimental group (A)

The experimental group subjects were given three sessions of High Velocity Low Amplitude Thrust (HVLAT) single thrust at elbow on alternate days.

Control group (B)

The control group subjects were given Conventional Physiotherapy. A three session protocol on alternate days involving the application of Deep Tissue Friction Massage (DTFM), Thermotherapy and Ultrasonic therapy were given.

Both groups were given an informative booklet in English and Regional language. This booklet contains home exercises with pictorial illustrations. The subjects of both groups were proscribed from taking any other treatment for lateral epicondylalgia. The subjects were permitted to take medications or therapeutic measures for the comorbidities if any.

IV. RESULTS

In this study to analyze the effects on the outcome measures before and after High Velocity Low Amplitude thrust (HVLAT) in Group A (experimental group) and Deep Tissue Friction Massage (DTFM), Heat therapy and Ultrasound therapy in Group B (control group), all data was expressed as mean +/-, standard deviation and was statistically analyzed using paired't' test and independent't' test to determine the statistical difference among the parameters at 0.5% level of significance.

Paired't' test was used to examine the changes in dependent variables from baseline to after completion of intervention in each group. The pretest mean value of Pain Visual Analog Scale (VAS) in Group A is 7.58 (S.D=0.96) and the posttest mean value is 3.86 (S.D=1.18) with t value 38.24 and p value <0.05. (Table 1)

The pretest mean value of Pain Visual Analog Scale (VAS) in Group B is 7.47 (S.D=1.01) and the posttest mean value is 4.76 (S.D=1.16) with t value 39.11 and p value <0.05. (Table 1)

The independent't' test is done to calculate the significance of difference in VAS scores between Group A and Group B. The mean of differences of VAS scores between pretest and posttest in Group A is 3.72 (S.D=0.87) and in Group B is 2.71 (SD=0.62) with t-value 8.45 ($p<0.05$). (Table 2)

The pretest mean value of Patient rated tennis elbow Evaluation questionnaire in Group A is 72.41 (S.D=10.72) and the posttest mean value is 44.15 (S.D=10.26) with t value 32.49 and p value <0.05. (Table 3)

The pretest mean value of Patient rated tennis elbow Evaluation questionnaire in Group B is
75.15 (S.D=9.01) and the posttest mean value is 54.81 (S.D=9.47) with t value 47.76 and p value <0.05. (Table 3)
The independent't' test is done to calculate the significance of difference in PRTEE questionnaire results between Group A and Group B. The mean of differences of PRTEE questionnaire scores between pretest and posttest in Group A is 28.26 (S.D=7.77) and in Group B is 20.33 (SD=3.80) with t-value 8.20 ($p<0.05$). (Table 4)
The pretest mean value of Hand grip strength in Group A is 25.25 (S.D=8.60) and the posttest mean value is 51.93 (S.D=7.60) with t value 34.89 and p value <0.05. (Table 5)

The pretest mean value of Hand grip strength in Group B is 25.50 (S.D=7.57) and the posttest mean value is 45.62 (S.D=7.60) with t value 40.01 and p value <0.05. (Table 5)
The independent't' test is done to calculate the significance of difference in Hand grip strength between Group A and Group B. The mean of differences of Hand grip strength between pretest and posttest in Group A is 26.68 (S.D=6.84) and in Group B is 20.12 (SD=4.49) with t-value 7.17 (p<0.05). (Table 6)
The difference of Pretest and posttest of VAS score of males is 3.69±0.98 and females is 3.77±0.66.
The difference of pretest and posttest of PRTEE score of males is 28.46±8.28 and females is 27.93±7.02.
The difference of pretest and posttest of Hand grip strength scores of males is 27.65±7.77 and females is 25.16±4.74.
From the above results we found that there is no statistically significant difference on VAS, PRTEE and Hand Grip Strength between males and females after administration of High Velocity Low Amplitude thrust (HVLAT) (Table 7).

In order to observe the prevalence of Lateral Epicondylalgia among different occupation we have sub classed occupations into 5 categories and percentage of incidence is calculated. From our study we found that white collar sedentary workers were more prone to develop Lateral Epicondylalgia followed by blue collar, Healthcare workers and housewife. The least incidence was found among white collar mobile workers (Table 8).

The effects of HVLAT on various physical dimensions of recovery among various occupations diagnosed with Lateral epicondylalgia was analysed for statistical significance by using one way ANOVA. The results show that there were no statistically significant differences among the groups (Table 9).

V. DISCUSSION

In the present study to evaluate the role of HVLAT on the physical dimensions of recovery in Lateral Epicondylalgia, we found that HVLAT given by a trained professional have a significant effect on various physical dimensions of recovery like pain, hand grip strength and functional independence. Traditionally all these days Lateral Epicondylalgia was conservatively managed by drugs and physical therapy. Physical therapy includes hot pack, Ultrasound therapy and deep friction massage. Even though these modalities give optimal results they are time consuming and few cases of remissions are also evidenced[21].

There is very few evidence available in support of HVLAT over Lateral Epicondylalgia. The same authors already published a pilot study which revealed beneficial effects of HVLAT which are statistically significant[19]. Even though the current evidence is not available on the role of HVLAT in alleviating pain, improving hand grip strength and functional independence, few authors suggested that manipulation therapy is beneficial in alleviating symptoms in lateral epicondylalgia[22,23-29].

The primary aim of HVLAT is to promote and optimise a healthy movement leading to aligned physical function throughout the body. HVLAT promotes fluid motion within the joint which further promotes optimal exchange of synovial fluid and nutrients[30] .When HVLAT is delivered, a pop sound is heard, scientifically known as Cavitation. This phenomenon physiologically decrease joint stiffness, removes nociceptor bombardment leading to rapid and localised analgesic effect[30] .

A study by Lennart Dimberg (1987)[31] concluded that there was no statistically significant difference between the prevalence of Lateral Epicondylalgia in blue and white collar workers which are in contrast with our study where we found that white collar worker had a higher incidence (40%) in comparison to blue collar workers (17.5%). However there was no statistically significant difference between the outcomes of treatment by HVLAT in blue and white collar workers.

Our study also assessed the impact of HVLAT on the outcomes among males and females. The results evidenced that there is no statistically significant difference on recovery among males and females indicating that HVLAT is equally effective in both males and females.

VI. CONCLUSIONS

Based on the results of the study it is concluded that HVLAT is beneficial in improving hand grip strength, functional independence and alleviating pain in patient with Lateral Epicondylalgia. Also we conclude that there is no difference on the outcomes among blue and white collar workers, males and females. Hence HVLAT can be recommended in Lateral Epicondylalgia for males, females and of any occupation.

Table1: Comparison of Pre-test and Post-test VAS Scores in Group A and Group B

	Pre-test (Mean±SD)	Post-test (Mean±SD)	't'- value	P- value
Group A	7.58±0.96	3.86±1.18	38.24	<0.05
Group B	7.47±1.01	4.76±1.16	39.11	<0.05

Table2: Comparison of Mean of differences in VAS scores among Group A and Group B

	Group A	**Group B**	**'t' value**	**P- value**

VAS Mean of differences	3.72±0.87	2.71±0.62	8.45	<0.05

Table 3: Comparison of Pre-test and Post-test PRTEE Scores in Group A and Group B

	Pre-test (Mean±SD)	Post-test (Mean±SD)	't'- value	P- value
Group A	72.41±10.72	44.15±10.26	32.49	<0.05
Group B	75.15±9.01	54.81±9.47	47.76	<0.05

Table 4: Comparison of Mean of differences in PRTEE scores among Group A and Group B

	Group A	**Group B**	**'t' value**	**P- value**
PRTEE Mean of differences	28.26±7.77	20.33±3.80	8.20	<0.05

Table 5: Comparison of Pre-test and Post-test Hand Grip Strength Scores in Group A and Group B

	Pre-test (Mean±SD)	Post-test (Mean±SD)	't'- value	P- value
Group A	25.25±8.60	51.93±7.60	34.89	<0.05
Group B	25.50±7.57	45.62±7.60	40.01	<0.05

Table 6: Comparison of Mean of differences in Hand Grip Strength scores among Group A and Group B

	Group A	**Group B**	**'t' value**	**P- value**
Hand Grip Strength Mean of differences	26.68±6.84	20.12±4.49	7.17	<0.05

Table 7: Comparison between Pre-test and Post-test differences among males and females on Hand grip strength, VAS and PRTEE on administration of HVLAT

	Males	Females	't' value	P- value
VAS	3.69±0.98	3.77±0.66	0.40	0.69
PRTEE	28.46±8.28	27.93±7.02	0.29	0.76
Hand grip strength	27.65±7.77	25.16±4.74	1.60	0.11

Table 8: Prevalence of Lateral Epicondylalgia among different occupations

Occupation	Number	Percentage
Blue Collar*	28	17.5
White Collar (Sedentary)#	64	40
White Collar (Mobile)@	12	7.5
Housewife$	28	17.5
Health care workers^	28	17.5

*carpenter, driver, plumber, electrician, farmer, mechanic, peon
#teacher, desk worker, computer operator
@marketing executive
$housewife
^doctor, nurse, pharmacist, ward boy

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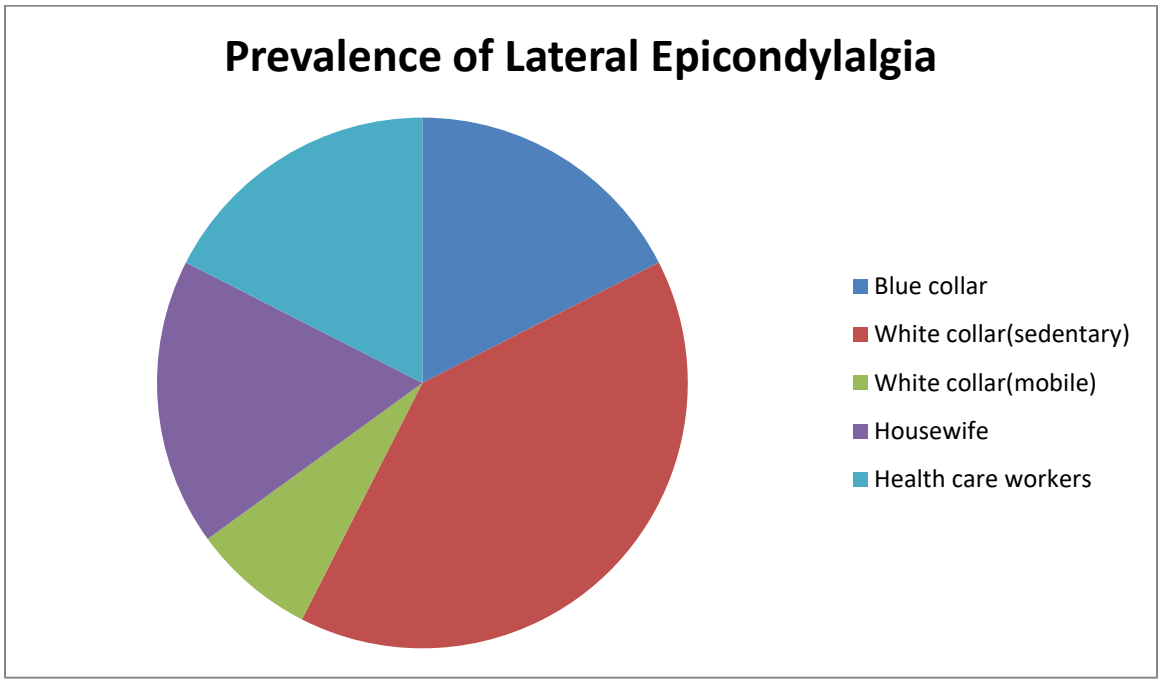

Table 9: Comparison of effects of HVLAT on various physical dimensions of recovery among different occupations

	Blue Collar	White Collar (Sedentary)	White Collar (Mobile)	House wife	Health care workers	'F' value	P-value	Significance
VAS difference Pre- post (Mean±SD)	3.87±0.80	3.73±0.96	3.25±0.95	3.61±0.76	3.76±0.83	1.90	>0.05	Not significant
PRTEE difference Pre- post (Mean±SD)	31.12±6.62	27.11±8.04	30.5±8.69	26.61±6.55	28.69±9.18	0.99	>0.05	Not significant
Hand grip strength difference Pre- post (Mean±SD)	27.18±7.73	27.05±7.18	26.25±10.30	23.46±4.73	28.46±5.15	1.57	>0.05	Not significant

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