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"THE EFFECT OF CONCENTRIC ISOTONIC CONTRACTION (CIC) VERSUS ECCENTRIC ISOTONIC CONTRACTION (EIC) ON TENDINOPATHY IN LATERAL EPICODYLITIS-A IN RANDOMISED CONTROL TRIAL"

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ABSTRACT

Abstract Background:- the isometric strength training is a part of physiotherapy program of muscle condition.Where tendinopathy is failed healing of response of tendon,with proliferation of tenocytes,interacellular abnormalities in tenocyte disruption of collagen fibre. Lateral elbow tendinopathy commonly refferd as lateral epicondylagia or lateral epicondylitis or tennis elbow which is one of the most common lesion of arm. Physiotherapy is a conservative treatment that is usually recommended where management of tendinopathy is done by tissue manipulation,electro therapeutic modalities
,exercise programme and manual techniques.

Study designs :- An overall evaluation approach was utilized in this framework.

Subject:- 50 subject were randomly divided in 2 groups and revived with 2 different techniques observed for 6 weeks

Methods:- Group A received concentric isotonic contraction with ice and Group B received eccentric isotonic contraction with 10 repetion

Result :- the result indicates a significant important loading to the rejection of null hypothesis and acceptance of alternative hypothesis .The analysis reveals that concentric isometric contraction with ice and eccentric contraction both lead to an improvement in range of motion.

CONCLUSION

Based on the findings, it can be determined that the null hypothesis was rejected and the alternative hypothesis was accepted in the current study. Consequently, it can be inferred that both concentric and eccentric isometric contraction exercises, combined with icing, are beneficial for enhancing range of motion and reducing pain in individuals with tennis elbow of normal weight. However, it should be noted that eccentric isometric contraction exercise with icing demonstrated more pronounced improvement compared to concentric isometric contraction with icing in normal weight tennis elbow subjects.

Keyword :- Tendinopathy, mill's rest, lateral epicondylitis, concentric isometric contraction,eccentric isometric contraction

INTRODUCTION

The isotonic strength training is a part of muscle conditioning. The aim is to maintain the length of muscle fibres. Literature found the effectiveness of isotonic strength training (concentric and eccentric) in reduction of pain, improvement of function and strength for lateral epicondylitis patients.

Mill's test is performed by palpating the lateral epicondyle, the examiner passively pronates the patient's forearm, flexes the wrist fully, and extends the elbow, A positive test is indicated by pain over the lateral epicondyle of the humerus. This manoeuvre also puts stress on the radial nerve and, in the presence of compression of the radial nerve.

Tendinopathy is a failed healing response of the tendon, with haphazard proliferation of tenocytes, intracellular abnormalities in tenocytes, disruption of collagen fibres, and a subsequent increase in non-collagenous matrix. Tendinopathy is the commonly accepted term for the clinical condition in and around overloaded tendons.

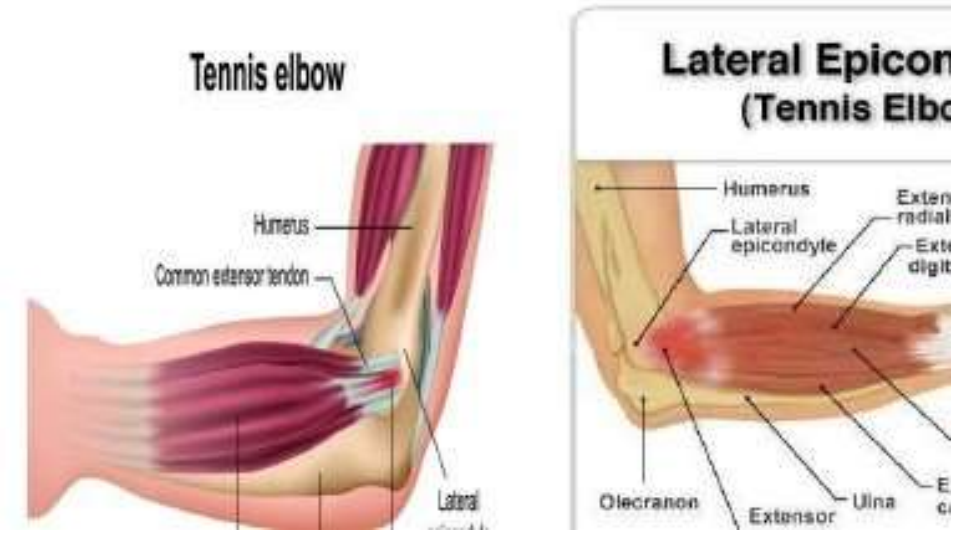
Sachin Tendulkar's career can be compartmentalized into many phases but none so harrowing as 2004-06 when tennis elbow almost threatened to end his career. "My tennis elbow injury, unfortunately, happened at the beginning of the season (2004-05). I was not even able to hold a bat then" disclosed by master blaster himself.

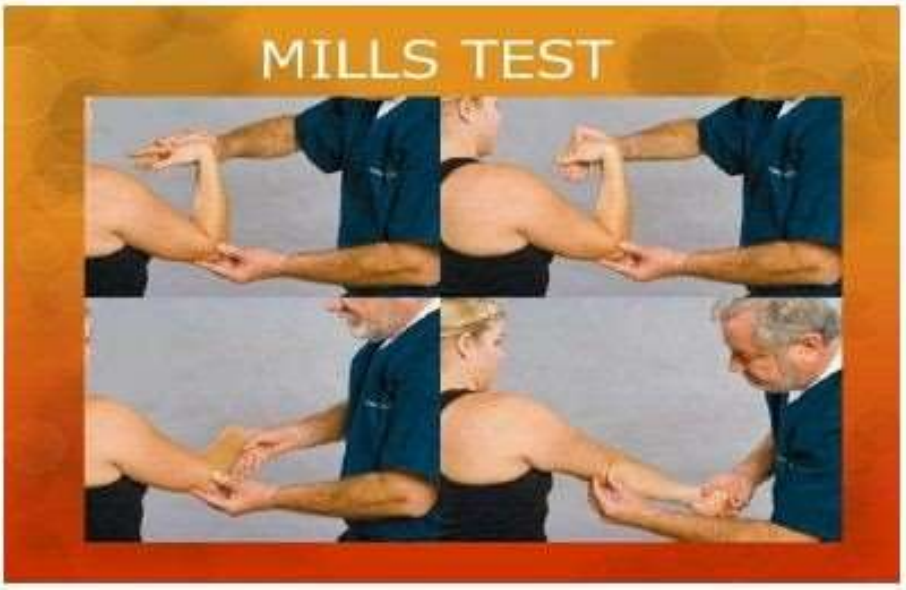
Lateral elbow tendinopathy (LET) commonly referred to as lateral epicondylitis, lateral epicondylalgia, lateral epicondylitis and/or tennis elbow is one of the most common lesions of the arm.

LET is one of the most common lesions of the arm work-related pain disorder or sport-related pain disorder. The condition is usually defined as a syndrome of pain in the area of the lateral epicondyle3 that may be degenerative or failed healing tendon response rather than inflammatory.

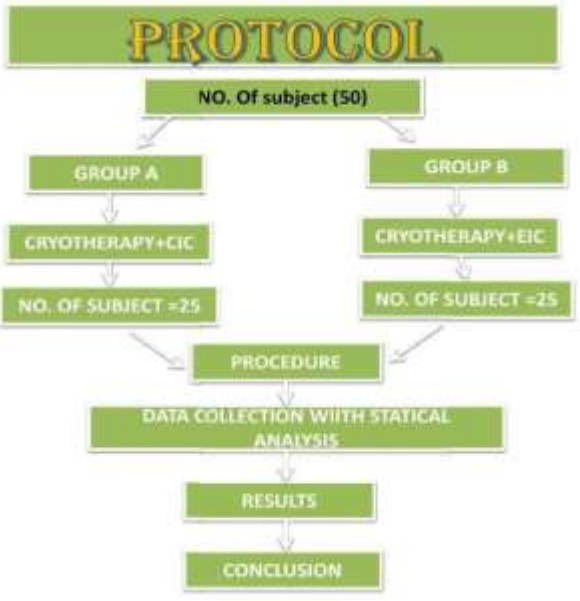
The area of maximal tenderness is usually an area just distal to the origin of the extensor muscles of the forearm at the lateral epicondyle. Most commonly, the extensor carpi radialis brevis (ECRB) is involved, but others may include the extensor digitorum, extensor carpi radialis longus (ECRL), and extensor carpi ulnaris.

Physiotherapy is a conse0rvative treatment that is usually recommended. A wide array of physiotherapy treatments has been recommended for the management of LET such as electrotherapeutic modalities, exercise programmes, soft tissue manipulation, and manual Techniques.





50 Subject were randomly divided into two groups; Group A received CONCENTRIC ISOTONIC CONTRACTION (ICC) and Group B received ECCENTRIC ISOTONIC CONTRACTION (IEC).



Group A:

ICE PACK

CONCENTRIC ISOTONIC CONTRACTION (CIC) technique: -

Concentric strengthening exercise was performed with weights (which were decided by the 10 RM) with patient in the seated position with full elbow 90 flexion, forearm pronation and wrist in neutral position. From this position, the patient slowly wrist into maximum extension for a count of 30, use the contra lateral hand to return the wrist to in flexion. Patients were instructed to continue the exercise even when they experienced mild discomfort and to stop the exercise if the pain worsens and becomes disabling. For whom the concentric exercise could be performed without minor discomfort or pain, the load was using weights based on the patients 10RM (Repetition Maximum). Five sets of ten repetitions were performed during each treatment, with a one-minute rest interval between each set.

Dosage:

- Warm up with wrist movement without any load for 2-3 min
- Cryotherapy given for 5-10 min
- Repetitions: starting from 5 till 15
- Sets: 5 (each time during treatment)
- Duration: 6 weeks

Group B:

ICE PACK

ECCENTRIC ISOTONIC CONTRACTION (EIC) technique: -

Eccentric strengthening exercise was performed with weights (which were decided by the 10 RM) with patient in the seated position with full elbow extension, forearm pronation, and maximum wrist extension. From this position, the patient slowly lowers wrist into flexion for a count of 30, use the contra lateral hand to return the wrist to maximum extension. Patients were instructed to continue the exercise even when they experienced mild discomfort and to stop the exercise if the pain worsens and becomes disabling. For whom the eccentric exercise could be performed without minor discomfort or pain, the load was using weights based on the patients 10RM (Repetition Maximum). Five sets of ten repetitions were performed during each treatment, with a 1 min rest interval between each set.

Dosage:

- Warm-up: with wrist movement without any load for 2-3 minutes
- Cryotherapy given for 5-10 min
- Repetition: Starting from 5till 15
- Sets: 5 (each time during treatment)
- Duration: 6 weeks

GROUP B ECCENTRIC ISOTONIC CONTRACTION (EIC)

NAME: AGE: SEX:

WEIGHT (KG): HEIGHT (CM): BMI:

VAS SCALE: MILL'S TEST:

PRE – ECCENTRIC ISOTOPIC CONTRACTION (EIC)			
Lt.		Ri.	
ROM	VAS	ROAI	VAS

Post ECCENTRIC ISOTOPIC CONTRACTION (EIC)			
Lt.		RC.	
RO41	VAS	ROAI	VAS

CONCLUSION

The data analysis was done by software SPSS 2019 version – 26. The descriptive statistical analysis was done to determine the demographic characteristics of the subjects recruited in the present study. The paired samples t – test used in the analysis of present study. p – value is used to test the hypothesis, which help in deciding whether to accept or reject the null hypothesis. A commonly used value for the p – value is 0.05.

TABLE 1: shows the Descriptive data of group 1 (concentric isometric contraction)

	N	Minimum	Maximum	Mean	Std. Deviation
Age	25	28	55	40.32	8.523
Weight	25	41	80	56.84	13.281
Height	25	146	177	163.31	7.907
Body mass index	25	16	30	21.07	4.295

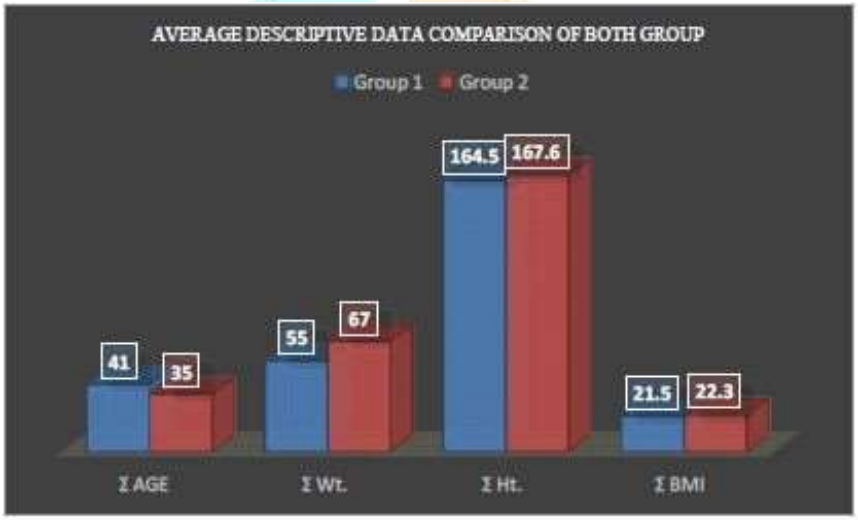
The Descriptive Data of **Table 1** shows that average age of group 1 subjects was 40.32 years, the average weight was 56.84 Kg and the average height was
163.31 cm. The average BMI of group 1 was calculated to be 21.07. This shows that average participants were in normal weight category in group 1.

TABLE 2: shows the Descriptive data of group 2 (eccentric isometric contraction)

	N	Minimum	Maximum	Mean	Std. Deviation
Age	25	25	54	36.92	10.255
Weight	25	40	85	64.72	13.455
Height	25	152	183	166.40	8.307
Body mass index	25	14	35	23.43	5.138

The Descriptive Data of **Table 2** shows that average age of group 2 subjects was 36.92 years, the average weight was 64.72 Kg and the average height was
166.40 cm. The average BMI of group 2 was calculated to be 23.43. This shows that average participants were in normal weight category in group 2.

Graph 1: shows average comparison of descriptive data between both groups



Graph – 1 represents compare wise distribution of Age, Weight, Height and BMI of all subjects of both groups i.e., group – 1: concentric isometric contraction with icing and Group – 2: eccentric isometric contraction with icing. A finding shows no significant difference in between all four parameters among both groups.

Table 3: shows statistical data of group 1: concentric isometric contraction

	N	Mean	Std. Deviation	Std. error mean	df	t – value	p - value
ROM	25	24.920	4.051	.810	24	30.758	.000
VAS	25	2.120	.833	.176	24	12.730	.000

The **table 3** shows the statistical data of difference between pre and post intervention of recruited subjects of group 1, while analyzing the data it has been found that the concentric isometric contraction exercise with icing was found significant in reducing pain and increasing range of motion in normal weight category. There is marked improvement in ROM with Mean (+SD) of 24.920 (+4.051) and t – value was 30.758 with *p* – value of .000, VAS with Mean (+SD) of 2.120 (+.833) and t – value was 12.730 with *p* – value of .000. So, the above table shows that the concentric isomeric contraction exercise was significant at the 95% of confidence level.

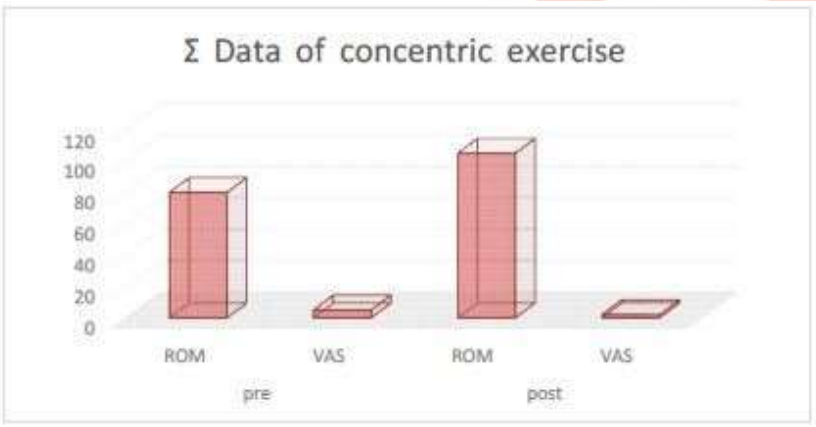
Table 4: showing statistical data of group 2: eccentric isometric contraction

	N	Mean	Std. Deviation	Std. error mean	df	t – value	p - value
ROM	25	54.600	8.631	1.726	24	31.629	.000
VAS	25	3.400	1.190	.238	24	14.283	.000

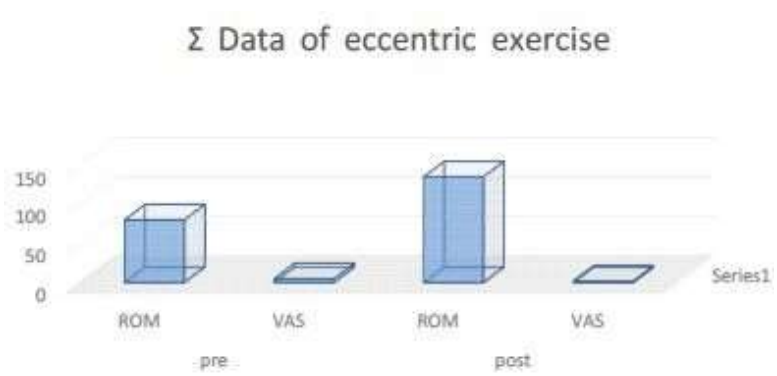
The **table 4** shows the statistical data of difference between pre and post intervention of recruited subjects of group 2, while analyzing the data it has been found that the eccentric isometric contraction exercise with icing was found significant in reducing pain and increasing range of motion in normal weight category. There is marked improvement in ROM with Mean (+SD) of 54.600 (+8.631) and t – value was 31.629 with *p* – value of .000, VAS with Mean (+SD) of 3.400 (+1.190) and t – value was 14.283 with *p* –value of .000. So, the above table shows that the eccentric isometric contraction exercise was significant at the 95% of confidence level.

RESULT

In the present study the statistical analysis in the 95% confidence level of paired samples t – test shows significant improvement i.e., the null hypothesis is rejected and alternate hypothesis is accepted and we statistically observed significant improvement in range of motion and decrease in pain by concentric and eccentric isometric contraction exercises with icing in normal weight tennis elbow patients.



Graph -2 represents the average data of concentric isometric contraction exercise with icing of all the recruited subjects in the present study, with pre and post intervention. A finding represents that, statistically concentric isometric contraction with icing shows improvement in ROM with Mean (+SD) of 24.920 (+4.051) and t – value was 30.758 with *p* – value of .000, VAS with Mean (+SD) of 2.120 (+.833) and t – value was 12.730 with *p* – value of .000.



Graph - 3 represents the average data of eccentric isometric contraction exercise with icing of all the recruited subjects in the present study, with pre and post intervention. A finding represents that, statistically eccentric isometric contraction with icing shows improvement in ROM with Mean (+SD) of 54.600 (+8.631) and t – value was 31.629 with *p* – value of .000, VAS with Mean (+SD) of 3.400 (+1.190) and t – value was 14.283 with *p* – value of .000.