



PREVALENCE OF LATERAL EPICONDYLITIS IN ELECTRICAL IRON PRESS WORKERS BY COZEN TEST

¹ Dr. Mansi Kothari, ² Dr. Gargi Bhalekar

¹ Bpht, Late Shree Fakir Bhai Pansare Education Foundation College of Physiotherapy, Nigdi, Pune, Maharashtra, India.

² Professor, HOD of Neuro physiotherapy Department, Late Shree Fakirbhai Pansare Educational Foundation College of Physiotherapy, Nigdi, Pune, Maharashtra, India.

Abstract: Lateral Epicondylitis is an overuse injury caused by the eccentric and concentric overload at the origin of common extensor tendon leading to the tendinosis and inflammation of the ECRB, so due to the repetitive occupational activities involving wrist extension and supination are taught to be causative. The need for study is repetitive movements cause hypertrophy of muscles and often results in loss of flexibility of muscles which is affecting the quality of work of the ironing workers.

Aim: To Find the Prevalence of Lateral Epicondylitis in Electrical Ironing Press Workers by Cozen Test.

Method: An Observational study was carried out on 98 ironing workers who uses Electrical iron box, with age group of 30-50years having 6-10 years of experience and 8-10 hours of working daily. The study was conducted in and around PCMC area Pune using purposive sampling method as per the inclusion and exclusion criteria. The subjects were informed about the study, so to find the prevalence of lateral epicondylitis the Cozen Test was performed and to rate the pain intensity the NPRS was used. Data was collected, analyzed and results were obtained.

Results: According to the Test performed as mentioned above 65.31% of the population tested positive for the Cozen Test and 34.69% were tested negative.

Conclusion: The Prevalence of Lateral Epicondylitis is 65.31% in Electrical Ironing Press Workers by using Cozen Test.

Index Terms: Lateral Epicondylitis, Electrical Iron Box, Extensor carpi radialis brevis, Cozen Test, NPRS.

INTRODUCTION:

Lateral epicondylitis is a common musculotendinous degenerative disorder of the extensor origin at the lateral humeral epicondyle. ^[1]

Repetitive occupational activities involving wrist extension and supination are thought to be causative. ^[1]

The typical symptoms include lateral elbow pain, pain with wrist extension, and weakened grip strength. ^[1]

It is more common in men than women and is believed to be a degenerative disorder. ^[1]

The muscle which is mostly involved is Extensor carpi radialis brevis (ECRB) and less frequently involved is Extensor carpi radialis Longus (ECRL).

In some cases, the extensor digitorum communis is also involved. [1] Patient complains of pain at the outer aspect of elbow and has difficulty in gripping objects and lifting them. ^[1]

The risk factors among the ironing workers need to be assessed in terms of gender, age, height of person, weight of the person, quantity of the clothes, working time per day and type of iron box. ^[2]

These people do the work or the business on small scale occupational industry or cottage industry. ^[2]

Ironing worker performed on roadside either by men or women is fully manually operated and generally lack in ergonomic aspects. ^[2]

It is the common condition in the age group of 30-50years. ^[3]

The workers often stand at a same place for hours. His upper limbs are in repetitive motion and lower limb is in static position. ^[3]

Static work is defined as a work in which muscles are contracting without motion. ^[3]

The main concern with static work is that the muscles are contracted and blood flow to the muscle groups is decreased. As a result, muscle soreness and fatigue occur. ^[3]

The worker is often lifting the iron box while ironing to provide uniform ironing in all the areas of the cloth deviations. ^[3] The average weight of the iron box is 7.5kg. ^[3]

It was found that 35.00 per cent of respondents were working between 6-8 hours/day and 65.00 per cent of respondents were working between 8- 10 hours/day. Almost 99.99% of workers work in standing posture during Ironing. ^[3]

The activities which ironing workers do is the Forceful lifting of the iron box, during ironing, forearm pronation and wrist into flexion and simultaneously radial and ulnar deviation while pressing the clothes and to hold the iron handle it requires the MCP Joints to be extended and digital phalanges are completely flexed. ^[3]

Diagnosis carried out for Lateral Epicondylitis is cozen test. ^[5]

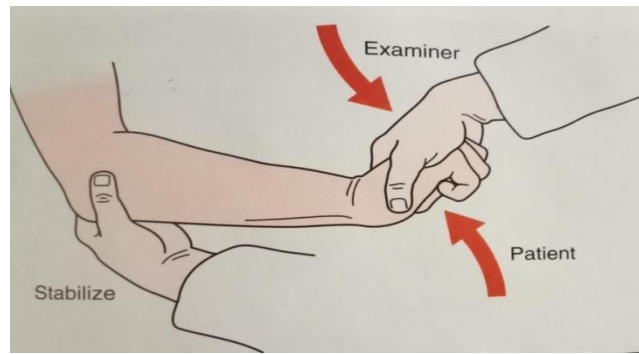


FIGURE 1: TESTING POSITION FOR COZEN TEST

II. METHODOLOGY

An Observational study was carried out on 98 ironing workers who uses Electrical iron box, with age group of 30-50 years having 6-10 years of experience and 8-10 hours of working daily. The study conducted in and around PCMC area Pune using purposive sampling method as per the inclusion and exclusion criteria. The subjects were informed about the study, so to find the prevalence of Lateral Epicondylitis the Cozen Test was performed and to rate the pain intensity the NPRS was used. Data were collected, analyzed and results were obtained.

II.A INCLUSION CRITERIA

1. Men^[1].
2. Age Group: 30-50years of age.^[3]
3. Workers have been working for 8-10 hours daily.^[3]
4. Men who have been working minimum for 6years and maximum for 10 years.
5. Willing for the participation.
6. Only those workers using electrical iron box.

II.B EXCLUSION CRITERIA

1. Women.
2. Elbow fracture.
3. Radial tunnel syndrome.
4. Tenosynovitis.
5. Peripheral nerve injury.

II.C OUTCOME MEASURES

1. Cozen Test:

- In the cozen test the patient elbow is stabilized by the therapist thumb and then patient is asked to actively make a fist, pronate the forearm, radially deviate an extend the wrist while therapist will resist the motion.^[5]
- The positive test indicates sudden pain at the lateral side of the elbow.
- Sensitivity: 83%.^[6]
- Specificity: 90%.^[6]



FIGURE 2: COZEN TEST PERFORMED IRONING WORKER



FIGURE 3: ERGONOMIC POSITION OF

2. NPRS:

Reliability: 0.95

III. STATISTICAL ANALYSIS

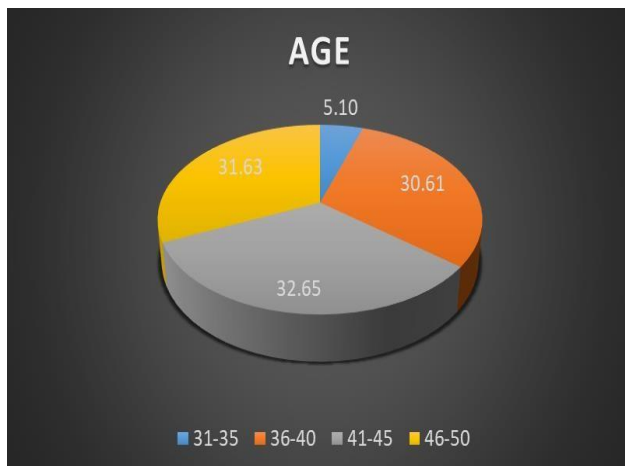
Data was collected and analyzed by appropriate statistical test.



IV.RESULTS

GRAPH 1: AGE DISTRIBUTION OF SUBJECTS

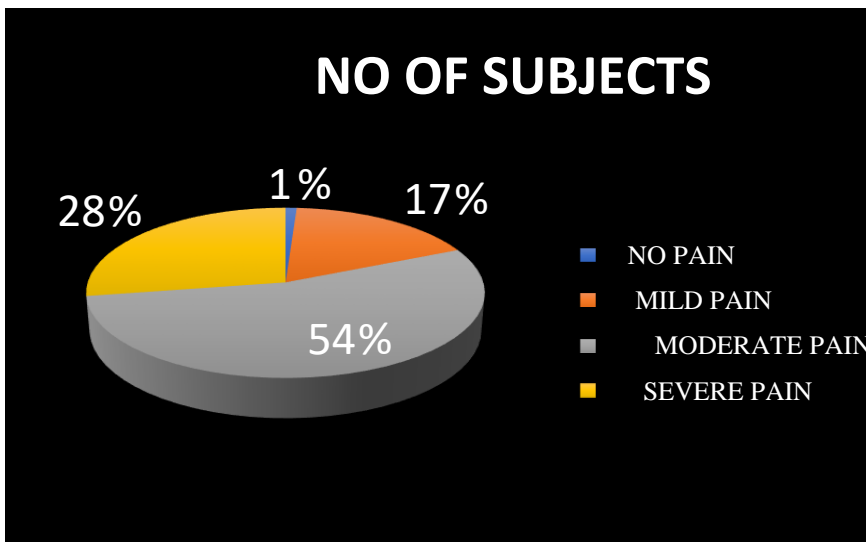
AGE OF PARTICIPANTS	NO OF PARTICIPANTS	PERCENTAGE
31-35	5	5.10
36-40	30	30.61
41-45	32	32.65
46-50	31	31.63
Grand total	98	100



INTERPRETATION: Graph 1 shows that 5.10 % (5) subjects are between the age of 31-35years, 30.61% (30) subjects are between the age of 38-40years ,32.65% (32) subjects are between the age of 41-46 years of age,31.63% (31) subjects are between the age of 48-50years.

GRAPH 2: DISTRIBUTION OF SUBJECTS AS PER NPRS

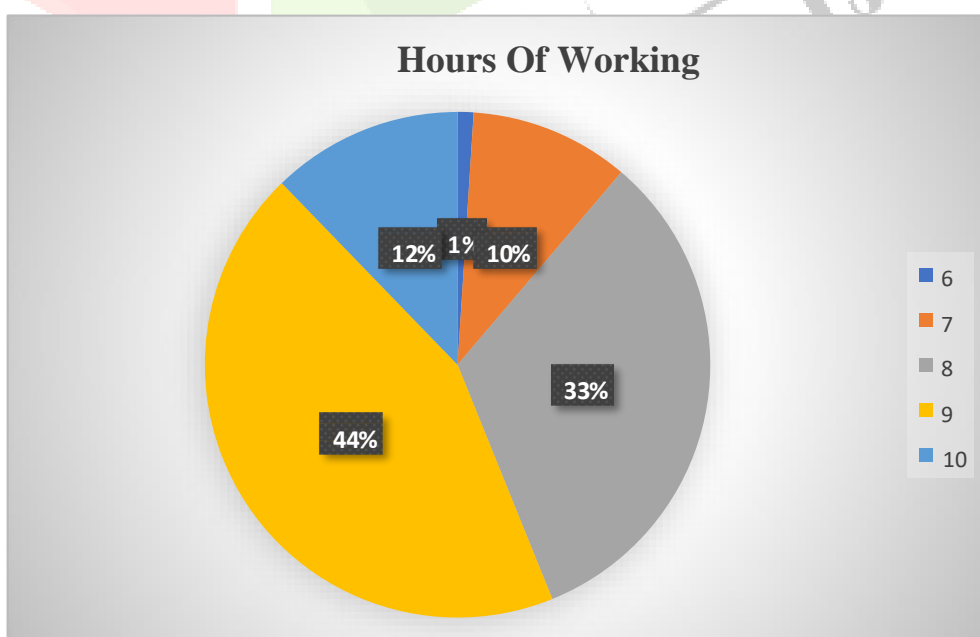
NPRS	NO. OF SUBJECTS	% PERCENTAGE
NO PAIN	1	1.02
MILD PAIN	17	17.35
MODERATE PAIN	53	54.08
SEVERE PAIN	27	27.55
GRAND TOTAL	98	100.00



INTERPRETATION: Graph 2 shows that 17.35% (17) subjects were having mild pain .54.08% (53) subjects were having moderate pain,1.02% (1) subjects were having no pain,27.55% (27) 11subjects were having severe pain.

GRAPH 3: DISTRIBUTION OF THE PARTICIPANTS AS PER HOURS OF WORKING

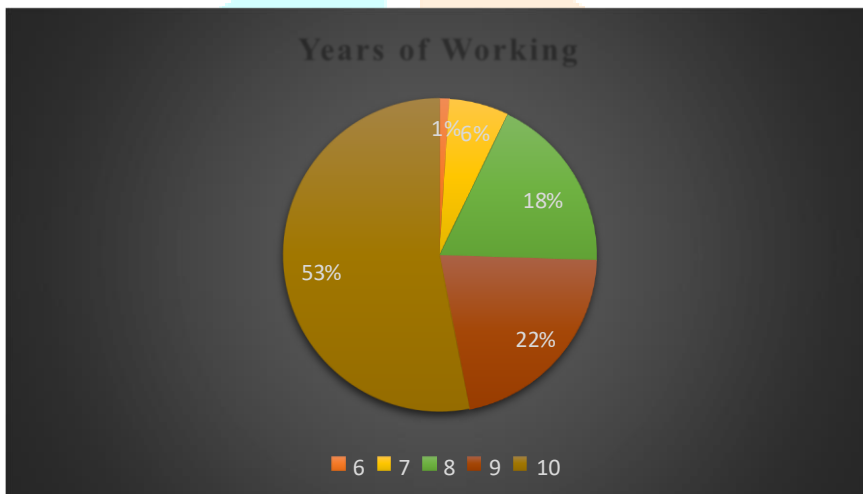
HOURS OF WORKING	No. of Cases	Percentage
6	1	1.02
7	10	10.20
8	32	32.65
9	43	43.88
10	12	12.24
Grand Total	98	100.00



INTERPRETATION: Graph 3 shows the hours of working, were in 1.02% (1) subject working for 6 hours ,10.20% (10) subjects were working hours are 7hours,32.65% (32) subjects were working for 8hours,43.88% (43) subjects were working for 9 hours ,12.24% (12) subjects were working for 10hours.

GRAPH 4: DISTRIBUTION OF SUBJECTS AS PER YEARS OF WORKING

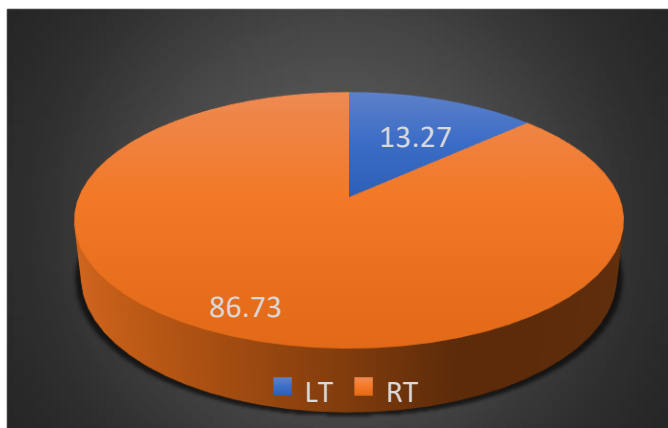
YEARS OF WORKING	No. of Cases	Percentage
6	1	1.02
7	6	6.12
8	18	18.37
9	21	21.43
10	52	53.06
Grand Total	98	100.00



INTERPRETATION: Graph 4 shows the years of working, were 1.02%(1) subjects are working for 6 years, 6.12 % (6) subjects are working for 7 years, 18.37%(18) subjects are working for 8 years, 21.43% (21) subjects are working for 9 years, 53.06%(52) subjects are working for 10 years.

GRAPH 5: DISTRIBUTION OF SUBJECTS AS PER HAND DOMINANCE.

HAND DOMINANCE	NO OF SUBJECTS	PERCENTAGE
LT	13	13.27
RT	85	86.73
Grand Total	98	100.00



INTERPRETATION: Graph 5 show the hand dominance, were 13.27% (13) subjects were left-handed and 86.73% (85) subjects were Right-handed.

GRAPH 6: DISTRIBUTION OF SUBJECTS AS PER WEIGHT OF IRON BOX.

WEIGHT OF IRON BOX	NO OF SUBJECTS	PERCENTAGE
6	12	12.24
6.5	4	4.08
7	49	50.00
7.5	22	22.45
8	11	11.22
Grand Total	98	100.00

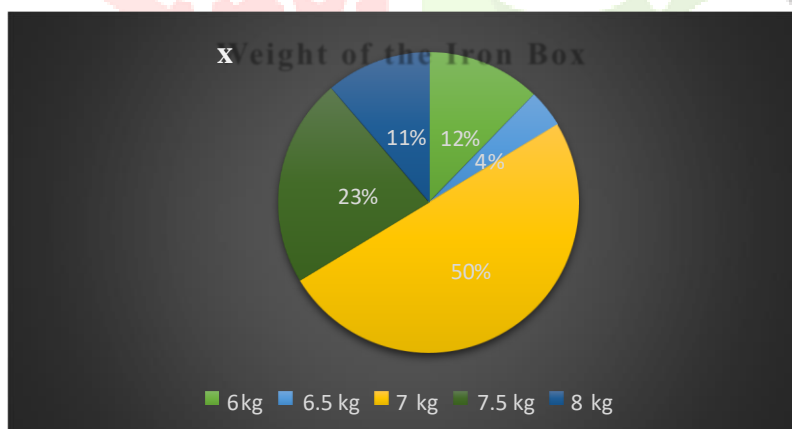


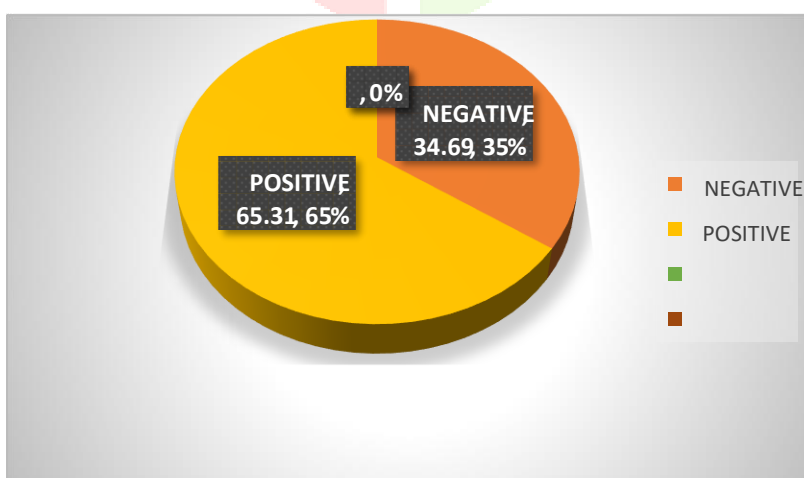


FIGURE 4: WEIGHT OF IRON BOX.

INTERPRETATION: Graph 6 show the weight of the iron box which subjects are using, here the 12.24% (12) subjects are using the iron box weighing 6kg, 4.08%(4) subjects are using the iron box weighing 6.5kg,0.00%(49) subjects are using the iron box weighing 7kg,22.45%(22) subjects are using the iron box weighing 7.5kg,11.22%(11) subjects are using the iron box weighing 8kg.

GRAPH 7: DISTRIBUTION OF SUBJECTS AS PER COZEN TEST

Cozen test	No. of Subjects	Percentage
Negative	34	34.69
Positive	64	65.31
Grand Total	98	100.00



INTERPRETATION: Graph 7 shows the distribution of the cozen test, were 34.69% (34) subjects showing negative test and 65.31% (64) subjects showing positive test.

The result was that the prevalence of lateral epicondylitis in electrical iron press workers by cozen test was 65.31% found positive during the study.

VI. DISCUSSION

Lateral Epicondylitis (also known as Tennis elbow) is an overuse injury caused by the eccentric and concentric overload at the origin of the common extensor tendon, leading to the tendinosis and inflammation of the ECRB. ⁽⁹⁾

Overuse of the muscles and tendon of the forearm and elbow together with repetitive contraction or manual tasks can put too much strain on the elbow tendons. ⁽⁹⁾

These contraction or manual tasks require manipulation of the hand that causes mal adaptations in tendon structure that lead to pain over the lateral epicondyle. ⁽⁹⁾

Pain is mostly located anterior and distal from the lateral epicondyle. ⁽⁹⁾

Repetitive occupational activities involving wrist extension and supination are thought to be causative. The typical symptoms include lateral elbow pain, pain while doing the wrist extension and grip strength reduced. ⁽¹⁾

The muscle which is mostly involved is Extensor carpi radialis brevis (ECRB) and less frequently involved is Extensor carpi radialis longus (ECRL). In some cases, the Extensor digitorum communis is also involved. ⁽¹⁾

The Age group which are mostly affected is 41-45 years with 32.65%, these age group are affected as the condition is degenerative with increased fibroblasts, vascular hyperplasia, proteoglycans, and immature collagen and which is leading to the granulation formation within the tendon and causing lateral elbow pain. ⁽¹⁰⁾ and age group of 31-35 years with percentage of 5.10% were least affected as these age group is not having much working years due to which percentage is less in these age group.

The study was done by Sujata Kumari, Ritu Gupta and Jatinder Kaur Gill conducted a study on "Assessment of work related Musculoskeletal problems among the workers engaged in ironing clothes" in 2020 and study concluded that work related musculoskeletal disorder are major health problems among the ironing workers which may due to performing physical work for a prolonged time period and undefined manual repetitive work and lack in ergonomic design and shows the average age of the respondents was found as 41 years with standard deviation. ⁽³⁾

The result of pain intensity showed that mostly subjects are having moderate pain with 54.08% because when the ECRB is weakened from overuse, microscopic tears form in the tendon where it attaches to the lateral epicondyle and leads to inflammation and pain. As the muscle are in stressed when the load and the force is applied simultaneously, due to which blood flow to the muscle groups is reduced, so the muscle goes under fatigue and muscle soreness.

Eleonore Herquelot, J, Roquelaure Y, Ha C, Leclerc A, Goldberg M, did study on Work related Risk factors for lateral epicondylitis and other causes of elbow pain in working population in 2013. The study concluded that the strength of the association between the combined physical exertion and elbow movements and Lateral Epicondylitis, certain observed difference in association with lateral epicondylitis and elbow pain only indicate the need for longitudinal studies and known Risk factors which was conducted by in which, a total of 389 (10.5%) workers had elbow pain without lateral epicondylitis and 90 (2.4%) workers had lateral epicondylitis. ⁽⁷⁾

The ironing workers movements of hand when they do ironing is forceful lifting of the iron box. during ironing there is simultaneously forearm supination and pronation with wrist into flexion and extension with simultaneously radial deviation and ulnar deviation while pressing the clothes and to handle the iron handle it requires the Meta carpal phalanges joint to be extended and digital phalanges are completely flexed. The Extensor carpi radialis brevis is at increased risk for the damage because of its static position.

The study was conducted by Z Joyce fan, Sarbara, Bao S on “Quantitative exposure-response relation between physical workload and prevalence of Lateral Epicondylitis in a working population” in 2009 and study concluded that frequency of forceful exertion or a combination of forearm supination and forceful lifting were significant physical factors and should be considered for prevention strategies.⁽⁴⁾

The movements which they have performed over the years causes the stress on the tendon i.e., ECRB and due to these there is degeneration of collagen which contain proteins, and which lead to stiffness and lack of mobility.⁽¹⁰⁾

The study was conducted by JP Haahr, JH Andersen on “physical and psychological risk factors for Lateral Epicondylitis” in 2003 and study concluded that due to non-neutral posture of hand and arm, use of heavy hand tools, and High physical exertion measured as a combination of forceful work, non-neutral posture of hand, arm, and repetition. Furthermore, tennis elbow among women was associated with low social support at work.⁽⁸⁾

The cozen test in which 64 subjects were positive and 34 subjects were negative. When the test performed the patient felt the pain over the lateral epicondyle due to inflammation of the muscle and repetitive movement of the hand causing the test to be positive. Hence the prevalence of the lateral epicondylitis in electrical ironing press workers is 65.31%.

VII. CONCLUSION

The results of the study showed that 65.31% prevalence of Lateral Epicondylitis is found in Electrical iron press workers.

VIII. CLINICAL IMPLICATION AND FURTHER SCOPE OF STUDY

- Intervention and newer technique can be studied in preventing of lateral epicondylitis in same population.
- Further complication related to lateral epicondylitis can be studied.
- On larger sample size the study can be done in age group above 60 years and years of experience can be taken more for example above 15 years of experience.

IX. LIMITATION OF STUDY

- To weigh the iron box the weighing machine were not available at some places.

X. REFERENCES

- 1) John Ebenezer. Textbook of Orthopedic, 4th edition. New Delhi: Jaypee; 010. p. 385-386.
- 2) Vijay Anand M, Vijayakumar K C K, Murugan PC, Bhuvanesh Kumar M. Prevalence of Wrist, Neck and Shoulder Pain Symptoms Among Ironing Workers In Occupational Laundry Shop. INTERNATIONAL JOURNAL OF SCIENTIFIC & TECHNOLOGY RESEARCH VOLUME 8, ISSUE 11, NOVEMBER 2019 ISSN 2277-8616.
- 3) Sujata Kumari, Ritu Gupta and Jatinder Kaur Gill. Assessment of work-related musculoskeletal problems among workers engaged in ironing clothes. Int.J. Curr. Microbial. App. Sci (2020) 9(05):p.186-193.
- 4) Fan ZJ, Silverstein BA, Bao S, Bonauto DK, Howard NL, Spielholz PO, Smith CK, Polissar NL, Viikari-Juntura E. Quantitative exposure-response relations between physical workload and prevalence of

lateral epicondylitis in a working population. American journal of industrial medicine. 2009 Jun;52 (6):479-90.

- 5) Orthopaedic physical assessment, 6ed by David J. Magee, PhD, BPT, CM, pg no. 407-408.
- 6) Saroja G, Aseer PA, Venkata Sai PM. Diagnostic accuracy of provocative tests in lateral epicondylitis. Int J Physiotherapy Res. 2014 Dec 11;2 (6):815-23.
- 7) Herquelot E, Bodin J, Roquelaure Y, Ha C, Leclerc A, Goldberg M, Zins M, Descatha A. Work-related risk factors for lateral epicondylitis and other cause of elbow pain in the working population. American journal of industrial medicine. 2013 Apr;56 (4):400-9.
- 8) Haahr JP, Andersen JH. Physical and psychosocial risk factors for lateral epicondylitis: a population-based case-referent study. Occupational and environmental medicine. 2003 May 1;60 (5):322-9.
- 9) Pienimäki T. Association between pain, grip strength, manual tests in the treatment evaluation of chronic tennis elbow. Clin J Pain 2002; 18(3):164-170.
- 10) Whaley A, Baker C. Lateral epicondylitis. Clin Sports Med 2004;23 (4):677-691.
- 11) Van Rijn R. Associations between work related factors and specific disorders at the elbow: a systematic literature review. Rheumatology (Oxford) 2009;48 (5):528-536.
- 12) Cyriax JH. The pathology and treatment of tennis elbow. JBJS. 1936 Oct 1;18 (4):921-40.
- 13) Stoeckart R, Vleeming A, Snijders CJ. Anatomy of the extensor carpi radialis brevis muscle related to tennis elbow. Clinical Biomechanics. 1989 Nov 1;4 (4):210-2.
- 14) Öhberg L, Lorentzon R, Alfredson H. Eccentric training in patients with chronic Achilles tendinosis: normalized tendon structure and decreased thickness at follow up. British journal of sports medicine. 2004 Feb 1;38(1):8-11.
- 15) Nirschl RP. Tennis elbow. Orthopedic Clinics of North America. 1973 Jul 1;4(3):787-800.
- 16) Wadsworth TG. Tennis elbow: conservative, surgical, and manipulative treatment. British medical Journal (Clinical research ed.). 1987 Mar 3;294(6572):621.