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# The prevalence of lateral epicondylitis in Non-occupational Sport bike riders in Pune

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**Abstract**
**Aim:** To study the prevalence of Lateral Epicondylitis in non-occupational sport bike riders in Pune.
**Objective:** To find out the prevalence of Lateral Epicondylitis in non-occupational sport bike riders in Pune.
**Methods:** In this study, we included 100 non-occupational sport bike riders (male and female) aged 20-40 years old with convenient sampling from various sport biking groups in Pune. We used a patient-rated tennis elbow evaluation (PRTEE) questionnaire to estimate the prevalence of LE among non-occupational sport bike riders.
**Results:** For the study 100 subjects were taken out of which 71 were male and 29 were female. The age distribution was between 20-40 years. The mean age being [mean age=27.76years, SD=5.261]. The prevalence of lateral epicondylitis was found to be 36%.
**Conclusion:** The prevalence of LE was found to be 36%.

**Keywords:** Non-Occupational Sport bike riders, PRTEE (Patient Rated Tennis Elbow Evaluation), lateral epicondylitis

## Introduction

Lateral Epicondylitis is a painful and relapsing condition, which can be easily identified. [1] Lateral epicondylitis refers to pain in the lateral epicondyle owing to overuse of the extensor muscles of the forearm. [4] Lateral Epicondylitis commonly known as "Tennis Elbow" is one of the most frequently found musculoskeletal disorders of the arm. [1] The word epicondylitis suggest inflammation but today it is clear that lateral epicondylitis is a degenerative disorder that comprises the extensor tendons originating from the lateral epicondyle. [12] Nirschl classified lesions secondary to tendinous micro trauma in cases of lateral epicondylitis, into four stages. [13] The first stage is inflammatory, reversible and without pathological alterations. The second stage is characterized by angiofibroblastic degeneration. The third stage is characterized by tendinosis associated with structural alteration (tendon tearing). In the fourth stage, in addition to the latter alterations, fibrosis and calcification are present. [13] Lateral epicondylitis has a prevalence of about 1-3% general population every year and peak prevalence in 30 to 60 years of age. [13] Most common symptoms include tenderness and pain over the lateral epicondyle during wrist flexion and extension activities or repetitive pronation and supination, weak grasp and functional disability. The condition is associated with chronic tears in the origin of the extensor carpi radialis brevis and degenerative changes. [4] The activities of daily living of the patient in this disorder are adversely hampered as wrist extensors play an important role in maintaining wrist in extension during various ADLs. Physical factors including repetitive movements at the wrist and elbow joints, activities requiring increased handgrip forces, the use of vibrating tools could be the risk factors. [1] Lateral epicondylitis is associated with those who's occupation involved repetitive forearm and hand movements. [3] The risk factors of lateral epicondylitis are high physical exertion combined with elbow extension or extreme wrist bending. Lateral epicondylitis, also known as "tennis elbow," is an overuse syndrome of the common extensor tendon, predominantly affecting the extensor carpi radialis brevis. [14] Lateral epicondylitis typically occurs in the 4th and 5th decades, with equal prevalence in women and men. [14]

In a two wheeler, the throttle control is given by twist movement of the hand [2]. On continuous operation of throttle, the wrist undergoes fatigue which may lead to injury. [2] The body parts which are used to involve in operation are wrist, elbow, ankle and foot.[2]There was a survey conducted in the year 2018which suggests that both male and female riders experience pain in different parts of their body.[2] Majority of male and female riders are affected by wrist and elbow pain.[2]Professionals who use their arms in repeated motions or gripping are very susceptible to this condition. Sport bike can cause tennis elbow because of the way a motorcycle operates, forces and vibration from the road and even from the engine get transferred and absorbed by the hands, wrists, and arms of the rider. There are many repetitive wrist and hand movements that are required when riding a sport bike. Vibration either due to rough terrain or engine can lead to tennis elbow in two major. The first is the shock that is absorbed by the muscles, tendons, and joints in the arm just from the engine vibration. This is especially prevalent in big V-twin cruiser motorcycles. Combine this with some of the pavement, gravel, dirt, or other terrain faced during a motorcycle ride leading to increased stress on the arms causing damage and swelling to occur. The second part has somewhat of a snowball effect because more the motorcycle vibrates the greater the tendency to tighten your grip on the handlebars which not only increases the stress on the tissue and joints it also speeds up the onset of fatigue. Driving a motorcycle involves countless movements of the hand and wrist making fatigue the major concern.

Not much is known about the prevalence of lateral epicondylitis among motorcyclists, mainly for those who utilize motorcycles as part of their leisure activities. [5] Even though past studies have been conducted to investigate the prevalence of MSDs among riders who used motorcycles as part of their job (occupational motorcyclists), a proper study investigating the health problems among non-occupational motorcyclists is still lacking. [5] It is a fact that being involved in a motorcycle crash poses greater injuries as compared to motorcycle riding. [5] However, the risk in developing lateral epicondylitis by solely riding a motorcycle is still a concern and needs to be addressed. Nowadays there is a rising trend towards sport bike riding among young population, this type of riding increases the risk of developing an overuse injury which can lead to lateral epicondylitis. Hence there is a need to conduct a study on this topic.

## Materials and methodology

This survey is based on observational study held in and around sports bikers groups in Pune. 100 non-occupational sport bikers were approached for the study out of which 71 were males and 29 were females. Ethical clearance was taken from the institutional ethical committee of Tilak Maharashtra Vidyapeeth. After approval the aim & method of the study was explained & their consent on the consent from had taken from participants. After valid consent form participants was selected according to the inclusion & exclusion criteria.

The inclusion criteria were:

1. Only non-occupational sport bike riders
2. More than 1 year of driving experience
3. Age- 20-40
4. Male and female who rides sports bike
5. Willing to participate in this study

The exclusion criteria were

1. Subject who are not co operative
2. Subject having any neurological, musculoskeletal deformities

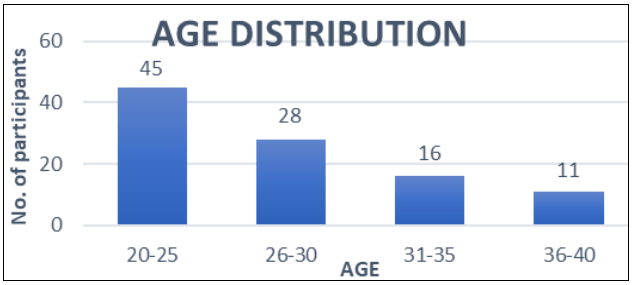
## Procedure

- Firstly, permission was taken from Tilak Maharashtra Vidyapeeth, department of Physiotherapy.
- Participants were included according to study's inclusion exclusion criteria
- A biker's group was approached and a meeting was conducted with the admin of the group and the procedure was explained to the admin who in turn explained his group members.
- The questionnaire was circulated and data was collected according to their convenient time
- The aim and objectives were explained to participants
- Consent was taken from the Participants.
- The study was explained to Participants.
- Participants willing to participate in the study were included.
- PRTEE (Patient Rated Tennis Elbow Evaluation) questionnaire was circulated to the participants.
- The participants were asked to select an appropriate option from the questionnaire.
- The data was collected and analyzed and appropriate results were found out.

## Result

**Table 1:** Age Group Distribution

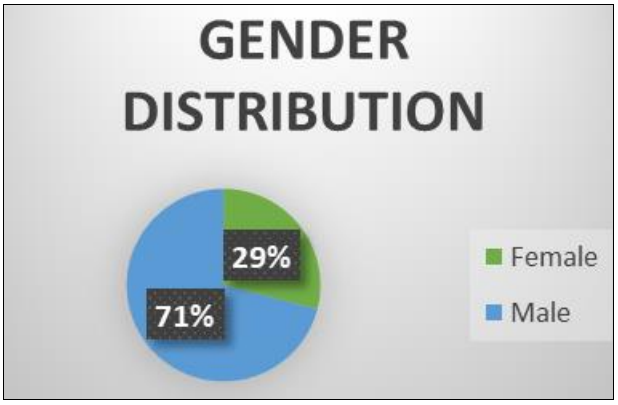
| Age | | | | |
|---|---|---|---|---|
| AGE | 20-25 | 26-30 | 31-35 | 36-40 |
| NO. of participants | 45 | 28 | 16 | 11 |




**Graph 1:** Shows age distribution

**Table 2:** Shows the number of males and females in the study

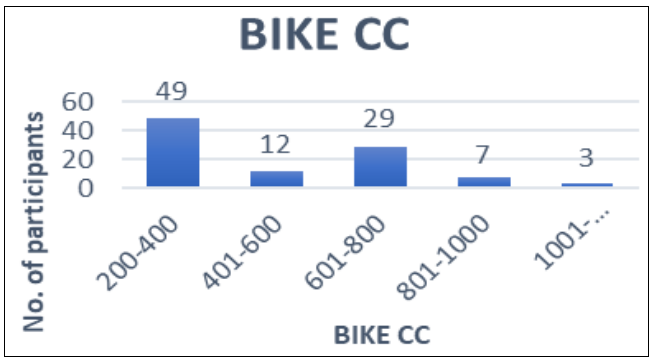
| Gender | Count of Gender |
|---|---|
| Female | 29 |
| Male | 71 |




**Graph 2:** Shows gender distribution amongst all participants

**Table 3:** Shows bike CC distribution amongst all participants

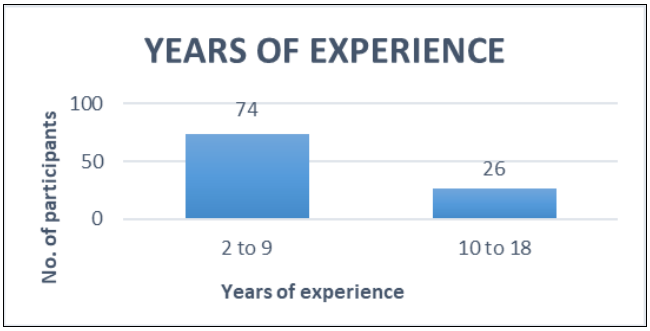
| BIKE CC | | | | | |
|---|---|---|---|---|---|
| **Bike cc** | **200-400** | **401-600** | **601-800** | **801-1000** | **1001-1200** |
| No. Of participants | 49 | 12 | 29 | 7 | 3 |




**Graph 3:** Shows bike CC distribution

**Table 4:** Shows Years of experience distribution

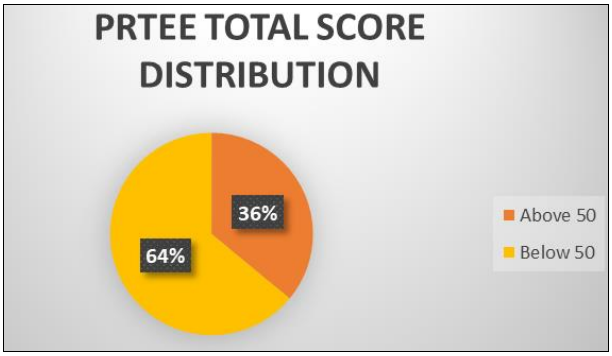
| Yrs of Experience | No. of participants |
|---|---|
| 2 to 9 | 74 |
| 10 to 18 | 26 |




**Graph 4:** Years of Experience

**Table 5:** Shows PRTEE total score above 50 and below 50

| Prtee Total Score (100) | | |
|---|---|---|
| **Total Score** | **Above 50** | **Below 50** |
| No. of Participants | 36 | 64 |




**Graph 5:** Total Score (Above 50 more towards lateral epicondylitis, below 50 less towards lateral epicondylitis)

## Discussion

The present study was done to see the prevalence of lateral epicondylitis in professional sport bike riders which was assessed using patient rated tennis elbow evaluation. Lateral epicondylitis is characterized by pain and inflammation of the tendons on the outer side of the elbow, typically caused by repetitive motions and overuse of the forearm muscles.

For the study 100 subjects were taken out of which 71 were male and 29 were female.

In this study, the prevalence of epicondylitis was 36%. In this study the Mean Age was found to be 27.76 with Standard Deviation of 5.261 and the Mean Score was found to be 26.925 with Standard Deviation of 23.503.

Since there is lack of studies on MSDs in non-occupational riders, these results can be compared to those of previous research that were associated with occupational riders.

### Age group distribution of participants

Graph 1 shows age group distribution of participants. This was categorised as 20-25 years, 26-30 year, 31-35 year and 36-40 year. 45% participants belong into the age group of 20-25 years old, 28% participants belong into the age group of 26-30 years old, 16% participants belong into the age group of 31-35 years old and 11% participants belong into the age group of 36-40 years old. In this survey, the age group (20-25) was identified to have highest (45%) of sport bike riders.

### Gender distribution of participants

Graph 2 shows that for the study 100 subjects were taken out of which 71 were male and 29 were female.

### Parcipants used sport bike engine capacity

Graph 3 shows bike CC distribution among participants. This was categorized as 200-400, 401-600, 601-800, 801-1000 and 1001-1200. 49% participants used 200-400 CC Bike, 12% participants used 401-600 CC Bike, 29% participants used 601-800 CC Bike, 7% participants used 801-1000 CC Bike and 3% participants used 1001-1200 CC Bike.

### Driving experience of participants

Graph 4 shows participants possessed riding experience. This was categorised as 2-9 years of experience and 10-18 years of experience. 74% participants were having 2-9 years of experience and 26% participants were having 10-18 years of experience.

### Prtee total score (100) distribution above 50 and below 50

Graph 5 shows PRTEE Total score (100) distribution amongst participants. This was categorized as above 50 and below 50. 36% participants were having above 50 score and 64% participants were having below 50 score.

Furthermore, we found that the occurrence of Lateral epicondylitis was more in participants riding higher Cc bikes which can be correlated with the study of "A case report of vibration induced hand comorbidities in a postwoman" (2011). This study suggests that prolonged exposure to hand-transmitted vibration is associated with an increased occurrence of symptoms and signs of disorders in the vascular, neurological and osteoarticular systems of the upper limbs. [21] This study have hypothesized a link between the use of motorcycles and disorders that involve hand strain. [21] Nonetheless, this study focus either on the levels of increased acceleration (the use of higher capacity motorcycles, travelling on rougher terrain. [21] Burstrom reported that higher vibration levels as well as firmer hand grips could cause higher absorption in the human hand-arm system. [21] This case report presents the hypothesis that the effect of HAV may result not in a single disorder, but in multiple disorders. [21] Although occupational epidemiological studies do not usually address comorbidity, it is not uncommon for exposure to produce multiple effects. An association between HAV and tendonitis has been reported. [21]

Furthermore the prevalence was seen in participants who had more years of experience which can be correlated with the study of "Prevalence and risk factors of LE among restaurant cooks at district Gujranwala: A cross-sectional study" (2021) in which the prevalence was seen in participants with high percentage time working with force in combination with awkward forearm postures were more likely to lead to LE. [1] The histopathological features of 11 patients who had LET were examined by Regan *et al*. [18] They determined that the cause of LET was more indicative of a degenerative process than an inflammatory process. The condition is degenerative with increased fibroplasts, vascular hyperplasia, proteoglycans and glycosaminoglycans, and disorganized and immature collagen. Repetitive eccentric or concentric overloading of the extensor muscle mass is thought to be the cause of this angiofibroplastic tendinosis of the ECRB. LET is a degenerative condition in which increased fibroplastic activity and granulation tissue formation occur within. There was a close association of epicondylitis with

repetitive movements. Because this tendinous region contains areas that are relatively hypovascular, the tendinous unit is unable to respond adequately to repetitive forces transmitted through the muscle, resulting in declining functional tolerance. [19, 20]

The study also showed the prevalence of LE peaked at the age of 25-40 years. According to a previous research "Diagnostic accuracy of examination tests for lateral elbow tendinopathy" (2021) LE is more prevalent between the age 30-50 years. [17]

The study also showed the prevalence of LE more in females than in males. According to a previous research "A case report of vibration induced hand comorbidities in a postwoman" (2011). All the previously cited studies were conducted on males doing heavy-duty work, as were the majority of vibration injuries investigations. [21] However, there are indications that vibration-induced injuries could be more common in women. [21] Compared with men, women seem to develop injuries after a shorter period of vibration exposure. [21] Bylund showed that women had a high prevalence of vascular, neurological, muscular and skeletal symptoms, even though they had undergone low accumulated vibration exposure. [21]

## Conclusion

There is prevalence of lateral epicondylities in non-occupational sport bike riders and by this study it has found to be 36%.

## Limitations

1. In data collection sheet occupation of participants was not involved.
2. Also Hand dominance of participants was not been asked.

## Future scope

1. To analyze the specific riding techniques and postures associated with operating higher cc bikes.
2. Investigating the ergonomic features of higher cc bikes, such as handlebar position, seat height, and footpeg placement.
3. Implementing targeted interventions, such as ergonomic modifications to bike components or the use of protective gear like vibration-damping gloves.
4. Comparative study in males and females in non-occupational sport bike riders.

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