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COMPARISON THE PREVALENCE AND ASSOCIATED RISK FACTORS OF ILIOTIBIAL BAND SYNDROME AMONG CYCLISTS AND RUNNERS. A CROSS SECTIONAL STUDY

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Abstract

Introduction: Iliotibial band (ITB) syndrome is a common consequence of long-distance running, particularly on gently inclined ground. ITB syndrome may also result from an abrupt increase in physical activity. Iliotibial band friction syndrome is an overuse injury usually seen in long distance runners, cyclists, and military personnel. I.T.B. syndrome is responsible for around 22% of all leg and foot injuries, according to recent studies. ITB Syndrome affects between 5-14% of runners, making it one of the most common causes of lateral knee pain. Typically, the underlying reasons of I.T.B.S. are complicated. Iliotibial band (ITB) injuries are a common consequence of long-distance running, particularly increasing. New evidence suggests that repeated compression of tissues may cause inflammation, but other explanations surrounding the genesis of the disease remain feasible. New evidences suggests that repeated compression of tissues may cause inflammation. Limited studied have been done, so limited literature is available to assess the prevalence of ITB syndrome in cyclist or other sports athlete other than runners. Therefore, our aim is to compare the prevalence and associated risk of Iliotibial Band syndrome among Cyclists and Runners.

Methodology: A cross sectional study was performed in Greater Noida city. The purposive sampling method was used to collect samples and requested to sign the consent and agreement of participation. They were then assigned to the Group A(runners) or Group B (cyclists). All the procedures and tests were explained to the subjects with all the effects. All the participants were requested to complete the demographic variables (age, weight, height, level of activity, and medical records). The participants then assess for Iliotibial Band Syndrome by performing all 3 tests (Ober's Test, Renne's Test and Noble Compression Test) and results were recorded for all participants. A comparison was made in both the groups for the co-relation of Iliotibial Band Syndrome.

Results: A prevalence of 46.6% runners (n=14) was reported positive in Group A (sample size 30) whereas only 30% cyclists (n=9) were reported positive in Group B (sample size 30) for Iliotibial Band Syndrome. For the Ober's Test results, Renne's Test results, Noble Compression results the results were same as 14:09 for Runners and Cyclist. Most runners were more affected than cyclist. There is a positive co-relation seen in all the test compared with the Age, weight, and height.

Conclusion: A moderate prevalence of ITB syndrome was observed among cyclist when compare with runners. The significant risk factors included age, level of activity, body mass index (BMI).

Keywords- Iliotibial Band Syndrome, Runners, Cyclist, Ober's Test, Renne Test, Nobel Test**.**

Introduction:

The **iliotibial band** is a thick band of fascia that stretches laterally from the iliac crest to the knee (1). This structure is composed of dense, fibrous connective tissue produced from the tensor fasciaelatae and gluteus maximus (2). It inserts at Gerdy's tubercle on the lateral tibial plateau and descends between the layers of superficial fascia down the lateral part of the thigh. The distal iliotibial tract includes the lateral femoral epicondyle and extends the patellar lateral border (3). Iliotibial Band **(ITB**) syndrome affects between 5 and 14% of runners, making it one of the most common causes of lateral knee pain. I.T.B. Syndrome is responsible for around 22 % of all leg and foot injuries, accordingto studies available (5). Iliotibial band syndrome is an overuse injury caused by repetitive friction of the iliotibial band across the lateral femoral epicondyle. Once considered an injury common to runners, it is now frequently being seen in cyclists. Iliotibial band (ITB) injuries are a common consequence of long-distance running, particularly also result from an abrupt increase in physical activity. New evidence suggests that repeated compression of tissues may cause inflammation, but other explanations surrounding the genesis of the disease remain feasible (6). Since iliotibial band syndrome increases hip internal rotation and knee adduction, hip abductor weakness is also associated with this condition (8). This is a major problem for athletes affected by ITB syndrome. Pain may also be caused by isolated thigh muscular bursitis (9). This syndrome is diagnosed by searching for several symptoms in patients (10). I.T.B. Syndrome sufferers experience intense pain on the outer side of their knee, especially when their heel meets the ground. This pain may migrate to the outer thigh and lower leg. Progressively running or walking downstairs exacerbates pain (11). The band may generate a snapping sound when it crosses over the tubercle when the knee is bent. Additionally, there is edema on the outer side of the knee. Commonly, runners have pain on the outside of their knees, which is increased by running long distances and made worse by jogging downhill or down steps (13). Lieutenant Commander James Renne, a medical corps officer who evaluated 16 cases out of a totalof 1,000 military recruits, documented the first instances of I.T.B.S. After 2 miles of jogging or 10kilometers of climbing, the discomfort often manifests on the outside aspect of the knee (14). As the patient walked with the knee extended, his symptoms diminished. On five individuals, palpation was compared as "rubbing a finger across a damp balloon (15)."

To maintaintheir conditioning, patients should be encouraged to engage in other forms of physical activity, such as swimming, that do not exacerbate their symptoms. It is necessary to work below the patient's pain threshold. Some authors recommend taking no more than three weeks off from all physical activity, others recommend between one and two months. The amount of time required to unwind relies largely on each individual's clinical evaluation (18). Studies suggest the prevalence in runners are high, and females are significantly more prone to suffer from ITB syndrome (17). Some findings indicate new quantitative evidence about the biomechanical risk factors associated with Iliotibial band syndrome in runners. (20). Other studies advocate that kinetics and kinematics of the hip, knee and/or ankle/foot appear to be considerably different in runners with ITB Syndrome to those without it (21). Studies conducting survey on lower limb injury concluded that the predominant site of these lower limb injuries was the knee. There was strong evidence that a long training distance per week in male runners and a history of previous injuries were risk factors for injuries, and that an increase in training distance per week was a protective factor for knee injuries (22). The current study set out to add to this previous research by investigating the prevalence among cyclist and try to find out whether cyclist, who involve in high physical activity of lower limb are equally suffers from ITB syndrome or what is the comparison ratio among cyclist comparing with runners and to find any correlation between their weight, age and height.

Hypothesis:

The prevalence of ITB syndrome in runners is greater than the prevalence in cyclists.
The prevalence of ITB syndrome in cyclists is greater than the prevalence in runners.
There is no significant difference in prevalence of ITB syndrome among runners and cyclists.

Methodology:
This is a cross sectional study which was conducted among the cyclist and runners members of fitness academy of Greater Noida City from August 2021 to December 2021. The participants were invited in the study through face-to-face interview of some fitness and sports academy in greater Noida city. Participants reported lateral knee pain were assessed for inclusion criteria, which include positive results for Ober's test, Renne test, Noble test. The consent form and the procedure were explained to the participants. Consent form was signed by each participant, which included complete information about the study procedures.
The assessment was taken which included observation, history (history of same symptoms). Participants with any knee injury in past or history of any lower limb surgery, meniscal or ligaments tear were excluded from the study. The primary outcome of the study was to compare the prevalence of ITB syndrome among Cyclist with Runners. The sampling method is sampling method. The sample size was calculated using Raosoft software by assuming a 90% confidence interval, with a margin of error kept at 0.10, the estimated sample size was 66. However, the participant found were 60. The participants included were both male and female with age group of 30 to 45 years.

Instrumentation and procedure
Participants who met the inclusion criteria and signed the consent form were eligible to participate in the study, with the complete information provided about the study procedures. Participants were examined for demographic data such as age, weight, height, and medical records were reviewed for any pre-existing conditions. The participants were categorized as groups, Group-A runners and Group-B cyclist. Both the Groups have 30-30 subjects. All the procedures were explained to the subjects and all the tests were explained to themwith all the effects. Ober's Test, Renne's Test and Noble Compression test were used to assess the Iliotibial Band Syndrome. All the 3 tests were performed, and results were taken for the subjects. Acomparison was made in both the groups for the co-relation of Iliotibial Band Syndrome. The assessment to check the prevalence of ITB syndrome is done by testing Ober test, Renne test and Nobel's test. Based on the positive scoring, the participants were characterized with or without ITB syndrome.

Statistical Analysis
The demographic variables were presented using descriptive statistics such as frequency, percentage, mean, and standard deviation (Table1). The Pearson correlation test was conducted to determine any correlation among the variables. The data analysis was carried out using the software's Social Science Packaging Software (S.P.S.S.) 26.0 edition. Readings were analyzed using an independent T-test. Graphical depiction created using Microsoft Word 2016.

Results
The demographic characteristics of the two groups were found to be significantly similar (table 1).

Table No 1 Demographic Descriptive Statistics (Weight, Height, Age)

	GROUP	N	Mean	Std. Deviation	Std. Error Mean
Age	CYCLERS	30	27.83	1.262	.230
	RUNNERS	30	28.00	1.145	.209
WEIGHT	CYCLERS	30	65.30	8.746	1.597
	RUNNERS	30	66.43	9.115	1.664
HEIGHT	CYCLERS	30	1.547	.1358	.0248
	RUNNERS	30	1.573	.1285	.0235

GRAPH NO 1: Demographic Descriptive Statistics (Weight, Height, Age)

The mean age of the participants was 27.83 and 28.00 years, with mean weight 65.30kg and 66.43kg and mean height of 1.547m and 1.573m for Group A and B respectively.
A prevalence of 46.6% runners (n=14) was reported positive in Group A (sample size 30) whereas only 30% cyclists (n=9) were reported positive in Group B (sample size 30) for Iliotibial Band Syndrome. For the Ober's Test results, Renne's Test results, Noble Compression results the results were same as 14:09 for Runners and Cyclist.
Most runners were more affected than cyclist. There is a positive co-relation seen in all the test compared with the age, weight, and height.

Discussion
The objective of this study was to compare the incidence and associated risk factors of Iliotibial Band Syndrome between cyclists and runners. Comparing Group, cyclist, and runners, the study revealed that (46.6%)14 runners were positive for Iliotibial Band Syndrome, while (30%) 9 cyclists were positive. For the Ober's Test, Renne's Test, and Noble Compression findings, the ratio was 9:14 for both cyclists and runners. All tests exhibit a significant correlation when compared to the age, weight, and height; both genders were equally affected but females were more affected than their male counterparts. These findings are consistent with previously reported studies which advocates runners are more prone to suffer with ITB syndrome. In 2015 a systemic review was done by Aderem et.al to list the biomechanical factors of ITB syndrome in runners. They concluded that the ITB syndrome is second most common injury found in runners and runners are more affected than any other sports professionals.(45). In 2020 Janine McKay et al. advocated that the female runners are more affected by ITB Syndrome than their male counterparts.(41)

Conclusion:
According to the findings of this research, we are able to draw the conclusion that there is higher prevalence in runners for Iliotibial Band Syndrome as compared with cyclist. Runners are more effected with Iliotibial Band Syndrome and all the test were positive more for runners’ subjects. The cause of this higher prevalence may be the ground reaction force and body weight bearing during stance phase which is more in running from all other sports activity. The cause of this prevalence will be a subject of scope in future for some further researches in this field. We also concluded that the weight of the athlete also shows positive correlation with the incidence of ITB syndrome. As the weight is higher the more the prevalence. Age of the athlete also contribute as a positive corelative factor for prevalence of ITB syndrome in athletes.

Future scope of study
More study can be done with higher sample size in the study for Both male and females' gender for correlation and different variables can be included

Conflict of interest: None

Limitation of study
- Less sample sizes
- Limited activates performed
- Limited Geographic region covered.

Table No 2 Gender Ratio

		Sex		Total
		FEMALE	MALE	
GROUP	CYCLERS	14	16	30
	RUNNERS	5	25	30
Total		19	41	60

Table No 3 Ober's Test results

		Ober's Test		Total
		POSITIVE	NEGATIVE	
GROUP	CYCLERS	9	21	30
	RUNNERS	14	16	30
Total		23	37	60

Table No 4 Renne's Test results

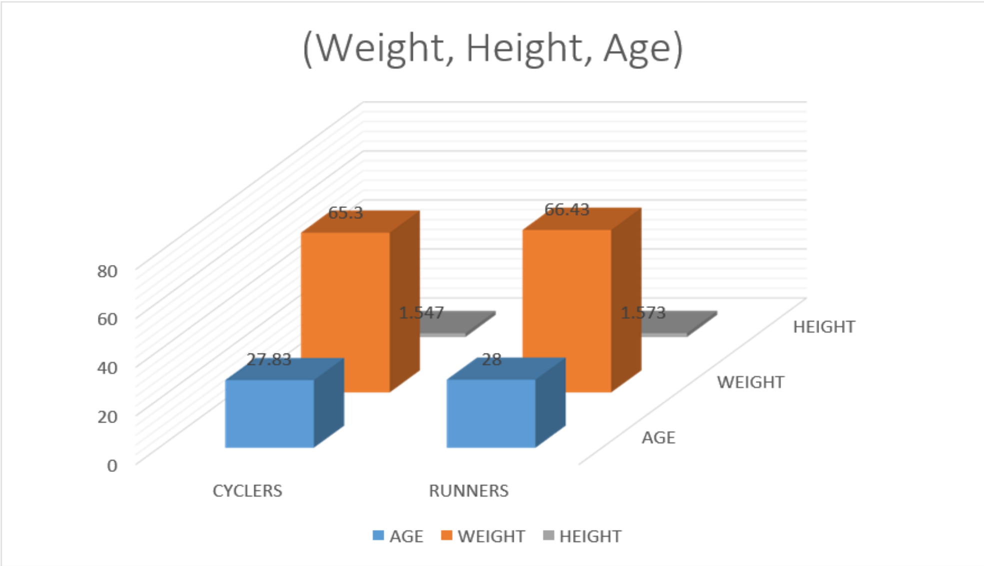
		Renne's Test		Total
		POSITIVE	NEGATIVE	
GROUP	CYCLERS	9	21	30
	RUNNERS	14	16	30
Total		23	37	60

Table No 5 Noble Compression results

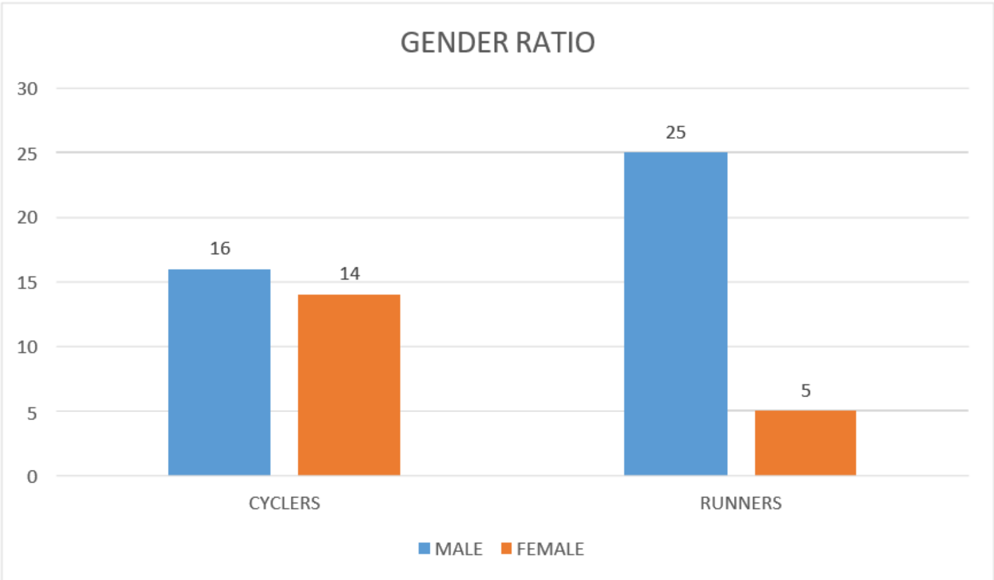
		Noble Compression		Total
		POSITIVE	NEGATIVE	
GROUP	CYCLERS	9	21	30
	RUNNERS	14	16	30
Total		23	37	60

Table No 6 Pearson Correlation test results

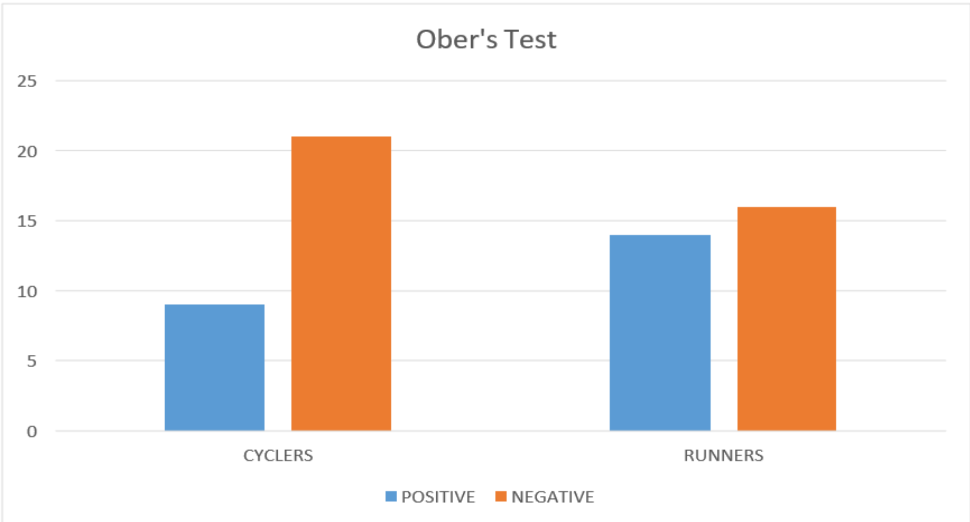
Correlations							
		Age	WEIGHT	HEIGHT	Ober's Test	Renne's Test	Noble Compression
Age	Pearson Correlation	1	.139	-.140	-.026	-.026	-.026
	Sig. (2-tailed)		.288	.287	.841	.841	.841
	N	60	60	60	60	60	60
WEIGHT	Pearson Correlation	.139	1	.107	.085	.085	.085
	Sig. (2-tailed)	.288		.416	.516	.516	.516
	N	60	60	60	60	60	60
HEIGHT	Pearson Correlation	-.140	.107	1	-.031	-.031	-.031
	Sig. (2-tailed)	.287	.416		.811	.811	.811
	N	60	60	60	60	60	60
Ober's Test	Pearson Correlation	-.026	.085	-.031	1	1.000**	1.000**
	Sig. (2-tailed)	.841	.516	.811		.000	.000
	N	60	60	60	60	60	60
Renne's Test	Pearson Correlation	-.026	.085	-.031	1.000**	1	1.000**
	Sig. (2-tailed)	.841	.516	.811	.000		.000
	N	60	60	60	60	60	60
Noble Compression	Pearson Correlation	-.026	.085	-.031	1.000**	1.000**	1
	Sig. (2-tailed)	.841	.516	.811	.000	.000	
	N	60	60	60	60	60	60
**. Correlation is significant at the 0.01 level (2-tailed).							



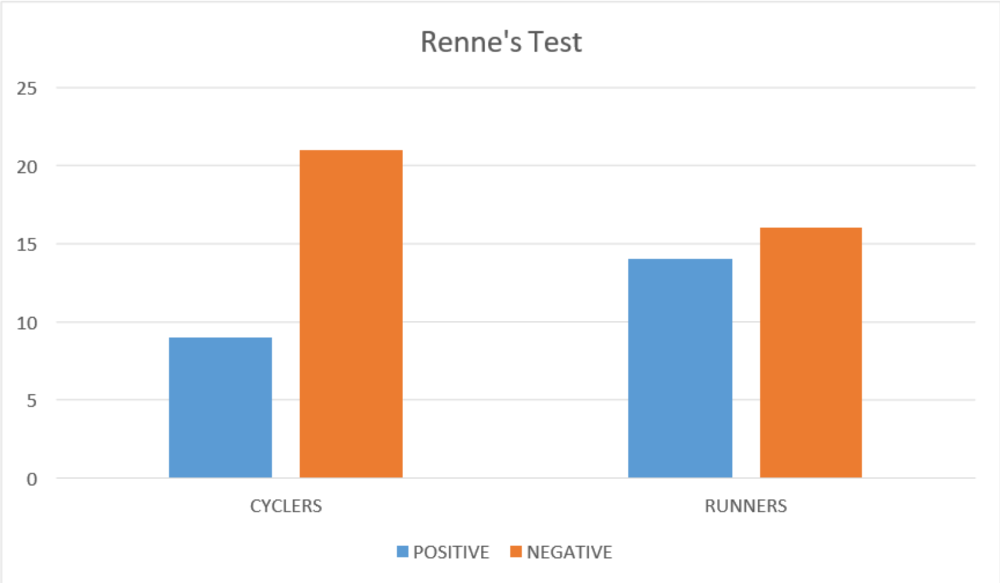
GRAPH NO 2: Gender Ratio



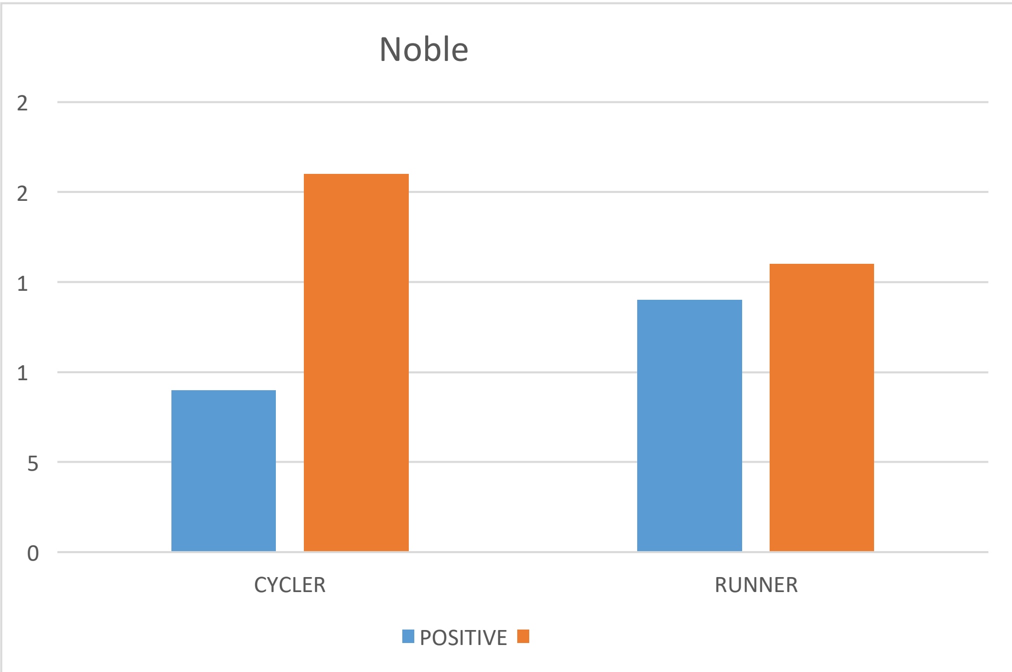
GRAPH NO 3: Ober's Test



GRAPH NO 4: Renne's Test



GRAPH NO 5: Noble Compression



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