



PREVALANCE OF PIRIFORMIS MUSCLE TIGHTNESS IN TRUCK DRIVERS USING FAIR TEST.

An Observational Study

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Abstract: Long hours of driving and extended periods of sitting have long been associated with various health concerns among truck drivers. One aspect of this occupational health challenge that has received limited attention is the prevalence of piriformis muscle tightness. The piriformis muscle, located deep within the buttock region, plays a crucial role in hip stability and leg movement. Its tightness can lead to discomfort, pain, and reduced mobility, significantly impacting the well-being and performance of truck drivers. This project, "Prevalence of Piriformis Muscle Tightness in Truck Drivers," seeks to address this critical gap in research by investigating the extent of piriformis muscle tightness among truck drivers. Understanding the prevalence and potential implications of this condition is essential for the development of preventive measures and interventions aimed at enhancing the musculoskeletal health, comfort, and overall safety of truck drivers during long hours on the road.

Method – An observational study was conducted on 125 subjects at several truck parking stop. Individuals were selected according to the inclusion and exclusion criteria. Individuals were explained about the procedure and informed consent was taken from all the included subjects before starting the procedure of the study. FAIR test was done.

Result - According to the tests performed there is a prevalence of piriformis muscle tightness in 73 truck drivers i.e., 58% out of 125 participating truck drivers and 52 participating truck drivers were not having tightness of piriformis muscle tightness i.e. 42% truck drivers.

Conclusion - According to the result 52% of participants have piriformis muscle tightness.

Index Terms – Piriformis tightness, FAIR test

I. INTRODUCTION

Piriformis muscle originates from the pelvic surface of the sacrum between (and lateral to) the first through fourth pelvic sacral foramina, margin of the greater sciatic foramen and the pelvic surface of the sacro-tuberous ligament and is inserted to the superior border of the greater trochanter of the femur via a round tendon that, in many individuals, is merged with the tendons of the obturator internus and Gemelli muscles & it is supplied by the sciatic nerve.

The sciatic nerve runs just adjacent to the Piriformis muscle, which functions as an external rotator of the hip. Hence, whenever the piriformis muscle is irritated or inflamed, it also affects the sciatic nerve. ⁽¹⁾

Sitting for a prolonged period can cause piriformis muscle tightness ⁽²⁾ Compression or irritation of the sciatic nerve can occur when the Piriformis muscle becomes inflamed, has spasms, or becomes tight.

Typically, this results from

Overuse – continuous contraction and relaxation of the piriformis muscle leads to micro trauma to the muscle.

Prolonged sitting- prolonged sitting also causes micro-traumas to the muscle due to mechanical vibrations which causes inflammation of muscle and tightness of the muscle.

Piriformis remains active during any sitting position ⁽³⁾

Truck drivers have to sit for a long time for more than 8-10 hours. Driving for more than 2 hours daily may cause Piriformis muscle tightness which may lead to sciatica and may be the reason for LBP ⁽⁴⁾.

Occupation which demands prolonged sitting in a chair including **motor vehicle drivers**, computer professionals, call center workers, piano players, office-based work etc. are more prone to develop Piriformis tightness ⁽⁴⁾

Sitting for a long duration can cause stress on the Piriformis muscle which may lead to inflammation and spasms of the piriformis muscle.

Piriformis muscle has a predominance of type-I fibers which has a tendency to develop shortness or tightness when the muscle is abnormally stressed. When the piriformis is shortened its diameter increases and because of its location it creates pressure on the sciatic nerve which passes under it in 80% of the population. ⁽⁴⁾

Boyajian-O'Neill et al. also stated that micro trauma to the muscle may result from direct compression as in sitting on hard surfaces ("wallet neuritis"). ⁽⁵⁾

The study by Usham Shyamkesho Singh et al showed prolonged sitting is the cause of piriformis syndrome due to muscle tightness in 69 (37.91%) cases in his study. ⁽⁶⁾

Delayed Diagnosis of piriformis tightness may lead to pathological conditions of the sciatic nerve, chronic somatic dysfunction and compensatory changes and it may cause pain, paraesthesia, hyperesthesia and muscle weakness. In extreme cases, misdiagnosis of piriformis syndrome-related back pain with “sciatica” as the prolapsed intervertebral disc may lead to unnecessary surgery. ⁽⁶⁾

The prevalence of piriformis tightness with relevance to sitting duration is scarce in the literature. Therefore the present study to find the prevalence of piriformis tightness with relevance to the sitting duration is necessary so the proper corrective and preventive measures can be taken In time which may reduce the rate of lower back pain because of piriformis tightness ⁽⁶⁾

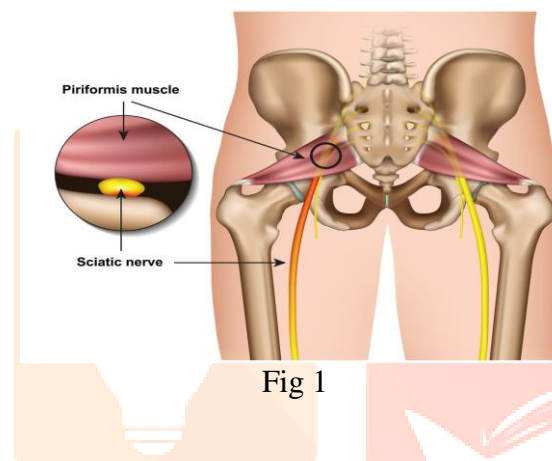


Fig 1

II. METHODOLOGY

This Observational study is conducted on 125 subjects who are truck drivers driving for more than 8-10 hours. Ethical committee clearance was obtained and permission was taken from the department. Written consent was taken from the subjects who fulfilled the inclusion criteria and exclusion criteria. The subjects were informed about the procedure FAIR test for assessment of Piriformis muscle tightness.

II.A INCLUSION CRITERIA

- 25 years of age and above
- Gender: Male Drivers
- Working as a truck driver for 5 years
- Driving for more than 8 hours daily⁽⁷⁾

II.B EXCLUSION CRITERIA

- Participants with direct trauma to the hip or lower back
- Participants with tumors.
- Participants who are not willing

II.C OUTCOME MEASURES

FLEXION, ADDUCTION AND INTERNAL ROTATION TEST ⁽⁷⁾

PURPOSE: To check the piriformis muscle tightness

PATIENT POSITION: Position the patient on the side-lying with the tested hip on top.

PROCEDURE: The examiner stabilizes the hip and applies downward pressure to the knee to internally rotate and adduct the hip thus placing the piriformis on a stretch that compresses the sciatic nerve.

POSITIVE RESULT: A positive test occurs when pain is produced in the sciatic/gluteal area.



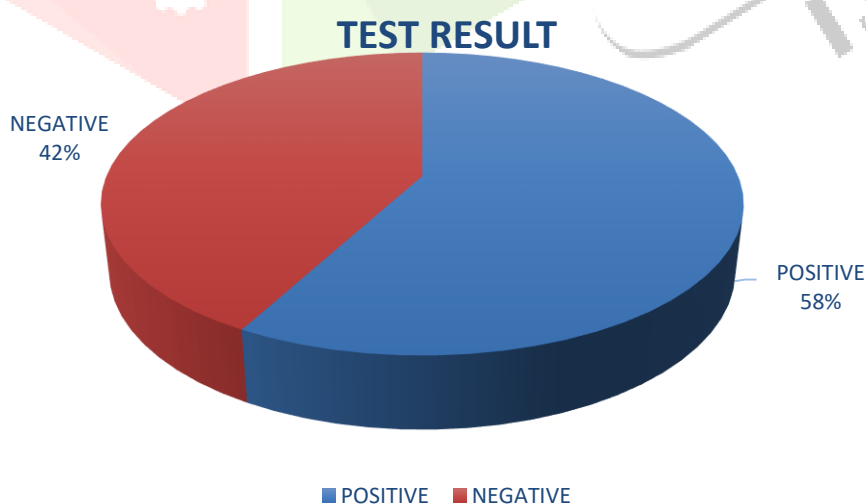
III. STATISTICAL ANALYSIS

Data was collected and analysed.

IV. RESULTS

<u>FAIR TEST</u>	<u>RESULT</u>
<u>POSITIVE</u>	<u>73</u>
<u>NEGATIVE</u>	<u>52</u>

TABLE NO. 3



INTERPRETATION: - Pie diagram no. 1 describes the results of the study which shows that there is a prevalence of piriformis muscle tightness in 73 truck drivers i.e. 58% out of 125 participating truck drivers and 52 participating truck drivers were not having tightness of piriformis muscle tightness i.e. 42% truck drivers.

Prevalence of piriformis muscle tightness was checked among 125 truck drivers with an age range of 25-55 years, out of which 73 truck drivers tested positive for the FAIR test which signifies those drivers have piriformis muscle tightness and 52 truck drivers did not have piriformis muscle tightness. This overall prevalence of piriformis tightness was found to be statistically significant.

Age-wise description of the participants is given in table no. 1 and Bar diagram no.1 describes that the most participating truck drivers are of age 30-35 years followed by 36-40 years of age group.

Table no. 2 describes the period of driving daily in hours. This shows that most of the truck drivers drive for more than 8 Hrs. the bar diag. no. 2 describes the same.

V.DISCUSSION

The objective of the study was to find out the prevalence of piriformis muscle tightness in truck drivers with drive more than 8 hours. In the following study, it was found that the prevalence of Piriformis muscle tightness is 58.4% that is 73 subjects tested positive for FAIR Test from 125 subjects.

Heavy vehicle drivers like bus drivers, truck drivers and motor vehicle drivers with AIP have to drive for more than 8 hours⁽⁵⁾ sitting in the same position for most of the time. The research conducted by Boyajian O'Neil shows piriformis muscle is under more stress while sitting for more than 8 hours.⁽¹²⁾ These stresses cause inflammation of the piriformis muscle leading to the piriformis muscle tightness.⁽⁹⁾

The study conducted by Malika Mondal on the prevalence of piriformis tightness in healthy individuals has shown that piriformis muscle is active in all types of sitting causing the continuous contraction of the muscle.⁽³⁾ This causes tightness of the muscle.⁽¹³⁾

According to the study by Fedoryk D J. sitting for a prolonged period causes weakness of gluteal muscles which causes synergistic activation of the piriformis muscle so the over-activation of the piriformis muscle causes hypertonicity and micro trauma which causes inflammation of the piriformis muscle.⁽¹³⁾ hypertonicity of the muscle which may lead to tightness of the piriformis muscle.

The majority of the truck driving seats were hard and not ergonomically designed. This causes direct compression of the piriformis muscle. The study by Keskula DR, and Tamburello M. proved that pressure from sitting over hard surfaces causes muscle micro injuries.⁽¹⁴⁾ This may explain the cause of piriformis muscle tightness in 73 (58.4%) truck drivers

In the study 52 i.e. (41.6%) drivers were found to be negative for the test. This may be explained by the rest intervals, early age and properly cushioned and ergonomic seats they use.

Most of the unaffected subjects use the latest trucks and travel less distances. This may explain the cause of negative tests in 41.6% of subjects.

Sitting in a chair for eight hours or more may develop tightness of back and hip muscles such as hamstrings, iliopsoas, piriformis etc. and create strain on joints which remain in a constant position for a long time, especially when the muscles are under constant low-grade contraction to hold and maintain the sitting position⁽¹¹⁾.

When the piriformis becomes tight it can put pressure on the sciatic nerve causing irritation and pain down the back of the leg (sciatica).⁽¹⁴⁾

The piriformis muscle is considered a postural muscle, and the postural muscles tend to become overactive, hypertonic, weak and shortened in length. The piriformis muscle gets overactive and hypertonic during prolonged sitting and walking. When there is a weakness of the primary muscle which is responsible for specific joint movement causes the synergistic muscle to overcome and behave as a primary muscle. The primary work of piriformis is the external rotation of the hip and it works as a synergistic muscle with the gluteus muscle during hip abduction.⁽¹⁵⁾

VI. CONCLUSION

The prevalence of piriformis muscle tightness in Truck drivers was found to be 58.4% which concludes that the truck drivers driving for more than 8 hours are affected mostly by piriformis muscle tightness.

This may be due to prolonged sitting, mechanical vibrations from the cabin, inappropriate break intervals and lack of any physical activity during the trips.

This study concludes that truck drivers driving for more than 8 Hrs may have piriformis muscle tightness

VII. CLINICAL IMPLICATION

- The study helps identify and detect the prevalence of piriformis muscle tightness, enabling healthcare professionals to intervene promptly and prevent the progression of musculoskeletal imbalances.
- The study finds the prevalence of tightness in piriformis muscle. This knowledge can guide the development of preventive measures, such as ergonomic interventions, postural awareness programs, and exercises, to reduce the incidence and impact of piriformis muscle tightness in this population.

VIII. LIMITATION OF STUDY

- The absence of a control group in the study limits the ability to compare the prevalence of tightness of piriformis muscle in truck drivers
- Data was collected from a limited area.
- Limited sample size.
- The test cannot be a diagnostic measure for the study
- During the assessment, the subjects were not subjected to any restrictions or control over their activities. They were allowed to engage in exercises such as running, playing, and stretching, as they needed to maintain physical fitness for their UPSE exams.

IX. RECOMMENDATION AND FUTURE SCOPE OF STUDY

- The article will raise awareness among educators, and healthcare professionals about the consequences of tightness of piriformis muscle in this specific population.
- The project's findings could be used to develop customized rehabilitation programs or interventions specifically tailored for truck drivers. These programs may include exercises, stretches, and lifestyle recommendations to alleviate and prevent piriformis muscle tightness. Understanding the prevalence of upper cross syndrome in students studying for competitive exams will enable healthcare professionals to develop targeted treatment approaches.
- As telehealth and remote monitoring technologies advance, the project's insights could be integrated into such systems. Truck drivers could receive real-time guidance and monitoring of their muscle health, allowing for timely interventions.
- The data collected from this project could be further analysed using data analytics and machine learning techniques to identify patterns and predictors of piriformis muscle tightness. This could enable more accurate risk assessments and personalized interventions.
- The project's findings can be used to raise awareness about the importance of driver health and the risks associated with long hours of sitting. Educational materials and campaigns could be developed for both drivers and employers.

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