



Survey Of Foot Posture Among The Bus Conductors

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Abstract: : This study has been undertaken to find out and study about the foot posture among the Bus Conductors by using the Foot Posture Index 6 Scale. 85 participants were included in the study. Through this study it was evident that majority of the participants i.e. the sample size had pronated feet. Pronated foot posture is a risk factor for Medial Tibial Stress Syndrome and Patellofemoral pain.

Index Terms - Foot posture, Foot Posture Index 6, Bus Conductors, Pronated feet .

I. INTRODUCTION

Transport or transportation is the movement of people and goods from one place to another. This term is derived from the Latin words *trans* (across) and *portare* (to carry) ^{[1][2]}. In India many types of public transportation are available such as railways, airways, roadways. Among them buses play an important role.

In India, a government transport bus is controlled by a driver and a conductor. The conductor issues tickets to the passengers through handheld equipment. The conductors work in three shifts with a leave per week. In each bus one seat is reserved for the conductor. Though it is reserved he never gets time to sit due to overcrowding in the bus and he has to continuously roam for issuing the ticket to the passenger ^[3]. Many buses are old and have very poor maintenance. This often leads to increase in the vibratory forces produced. In addition to it the poor road conditions such as potholes and uneven surfaces further aggravate the musculoskeletal disorders among the Bus Conductors.^[3]

Bus conductors have prolonged standing hours. Daily they have duty hours for 8 to 10 hours. They undertake 3-4 trips daily, where one trip means a to and fro i.e., starting at the depot, reaching the destination and then returning back to the depot. During the journey they have to stand continuously for issuing tickets and monitoring the passengers of the bus. They get exposed to constant mechanical vibration generated by the

bus.^{[3][1]} Discomfort experienced in ankles or feet is due to constant standing position in running bus and also the forces on the ankle joint more commonly talocalcaneal joint may contribute to discomfort or pain^[2]. During the standing hours, due to the poor road condition and the continuous jerky movements of the bus there is abnormal weight shifting at the feet.

The foot plays an important role in locomotion as it primarily supports the weight of the body. The feet are flexible structures of bones, joints, muscles, arches and soft tissues. The deterioration of these structures often leads to deformity formation thereby losing the functionality of the foot^[4].

The foot Posture Index 6 scale is a valid and reliable scale for assessing the foot posture. (Validity- 0.360-0.593) (Reliability- Test-retest ICC- 0.61)^[5]. The six criteria of Foot Posture Index 6 are (A) talar head palpation, (B) supra- and inframalleolar curvature, (C) talonavicular prominence, (D) calcaneal frontal plane position, (E) abduction or adduction of the forefoot on the rearfoot, and (F) medial longitudinal arch congruence^[6]. The scoring for each criterion follows a scale of -2, -1, 0, +1, or +2. A score of -5 to -12 is labelled as a highly supinated foot, -1 to -4 as a supinated foot, 0 to +5 as a normal foot, +6 to +9 as a pronated foot, and +10 to +12 as a highly pronated foot^[6]. There are studies which concluded that higher degrees of FPI might have an effect on standing dynamic balance in healthy subjects.^[7]

II. METHODOLOGY

The study design is a Cross Sectional Survey and it uses convenience type of sampling. A total of 85 Bus Conductors were included in the study.

Inclusion Criteria- 1. Male Bus Conductors

2. Age between 20 to 58 yrs
3. Work experience for more than 2 years
4. Working Hours more than 6 hrs per day

Exclusion Criteria- 1. Spinal surgery in last 6 months.

2. Lower limb Surgery in last 6 months.
3. Spine, Hip, knee Deformity
4. Limb Length Discrepancy

III . PROCEDURE-

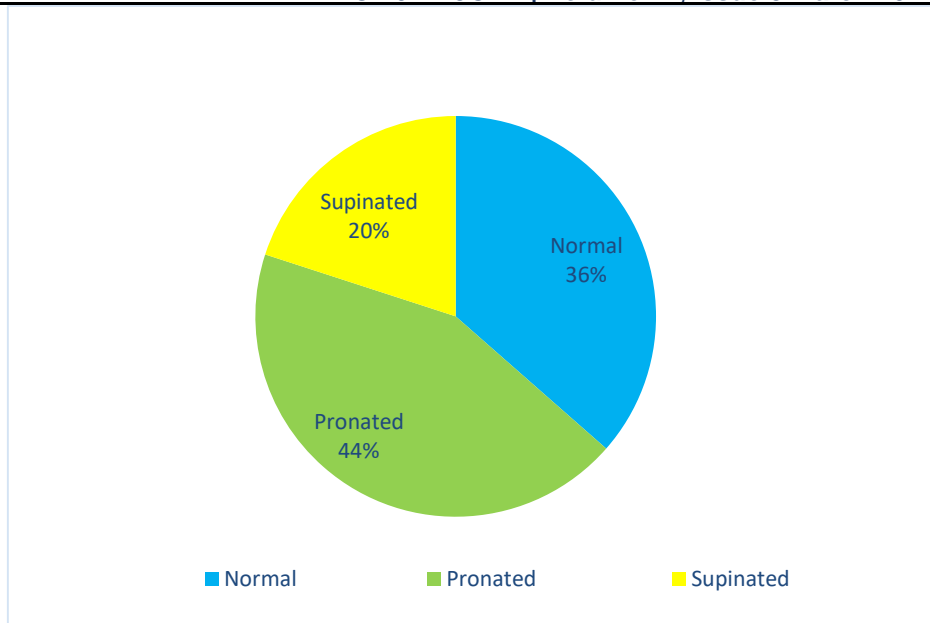
Approval had been taken from the Institutional Ethics Committee of TMV's Lokmanya Tilak College of Physiotherapy, Kharghar. The participants had been recruited in the study in accordance with the inclusion criteria. The participants were explained about the need of the study and the procedure in the language which they understood. An informed consent was taken from all the participants. The participants were interviewed and information regarding their demographic data and health related information was taken by the researcher. Then each one of them was being asked to stand in straight upright position facing forward. Scoring was done for the 6 components of the foot. For the 1st component component the talar head was palpated and scored by the researcher. For 2nd component curves above and below the lateral malleoli were observed. For 3rd component the calcaneal angle was assessed by using the goniometer. For 4th component the foot was observed for the prominence in the region of the talo-navicular joint from the medial aspect. For 5th component the medial arch height of the foot was observed from the medial aspect of the foot. For 6th component the foot was observed for forefoot abduction or adduction from behind. The data for each component of the foot posture index was being taken and it was statistically analyzed.

IV . DATA ANALYSIS AND RESULTS-

A total of 85 Bus Conductors were included in the study. The participants were in the age group of 20-55 years

Table 1- : Shows Demographic detail of Bus Conductors in which average age of Bus Conductor was 44 years, average Height was 1.66mts, average weight was 70.5 kgs, average BMI was 25.2kg/m², average years of working were 16 years.

	MEAN	STANDARD DEVIATION
AGE	44	8
HEIGHT	1.66	0.06
WEIGHT	70.5	9.63
BMI	25.2	4.54
YEARS OF WORKING	16.12	6.63

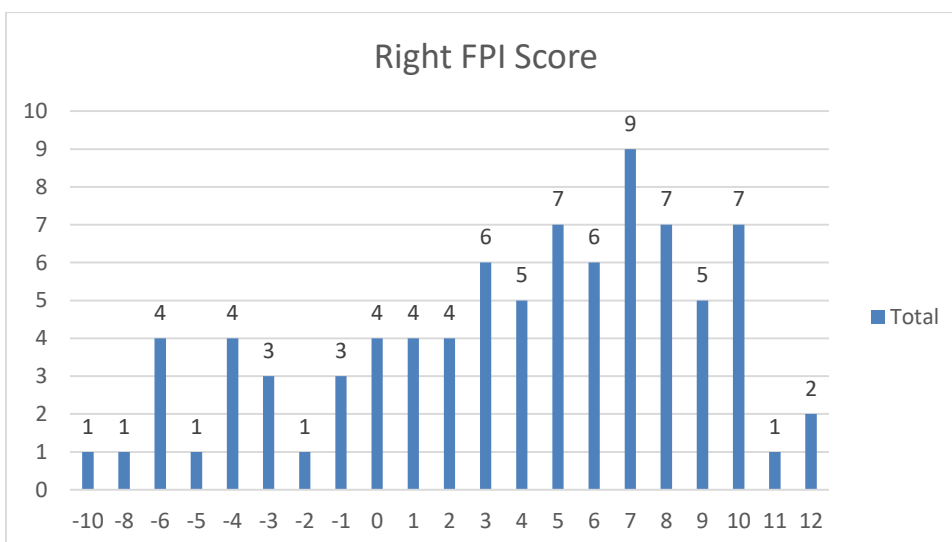


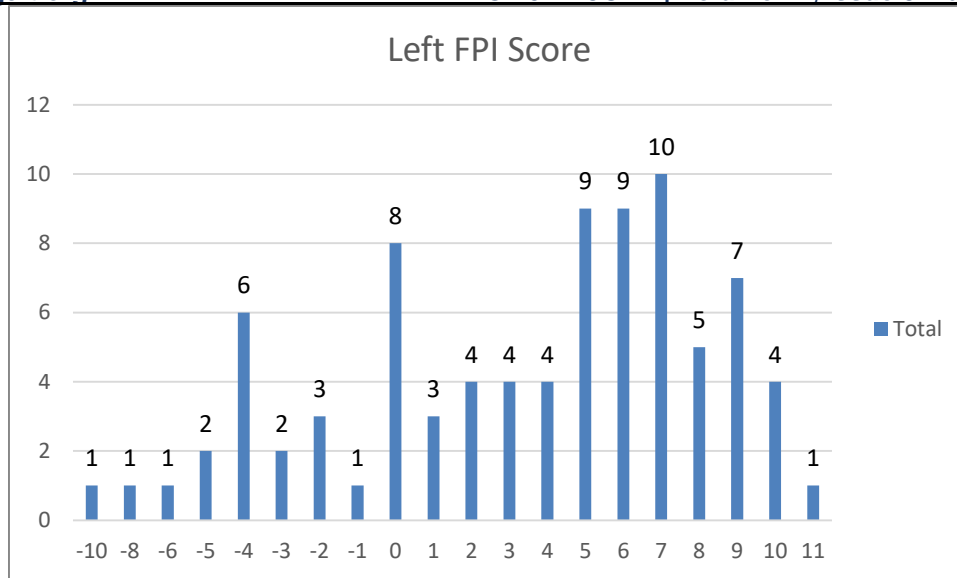
Out of the total 85 participants it was found out that :-

1. Number of participants with Normal FPI score was 31.
2. Number of participants with Pronated FPI score was 37.
3. Number of participants with Supinated FPI score was 17.

Table 3- Shows the Means of the FPI 6 score for the right and left feet

	MEAN	STANDARD DEVIATION
RIGHT FPI SCORE	3.42	5.08
LEFTFPI SCORE	3.42	4.75





V. DISCUSSION

Present study intended to study the Foot Posture of the Bus Conductors using the Foot Posture Index 6 Scale. Bus Conductors do the job of issuing tickets to the passengers, calling out passengers at the bus stop and also monitoring the passengers. While they are in Bus they need to stand continuously for issuing tickets. There is a lot of force on the intrinsic muscles of the foot. Due to abnormal posture while standing they also tend to continuously shift their weight from one foot to the other. As a result of constant weight bearing and weight shifts, there are chances of flattening of the arches, which often leads to Pronated Feet i.e Flatfoot.

Out of the 85 participants studied, 31 participants had Neutral feet, 37 participants had pronated feet and remaining 17 participants had supinated feet. Thus from the results of this study it was evident that majority of the bus conductors had Pronated Feet. This can be attributed to reasons such as excessive standing and rapid weight gain. Due to the flattening of the plantar arches of the foot, the ligaments supporting them and the plantar aponeurosis will be exposed to tension causing pain in that area ⁽⁴⁾.

The mean value for both the right FPI and Left FPI was 3.42. Out of the 85 participants many of the participants had a score ranging from 7 to 10 i.e. from Pronated to Highly Pronated score. According to a study done in 2014, it states that a pronated foot posture is a risk factor for Medial Tibial Stress Syndrome and Patellofemoral pain ⁽⁹⁾.

According to a study done in 2007, it states that Pronated feet also increase the risk of Chronic Plantar Heel Pain ⁽¹⁰⁾. When the foot is placed in pronation there is increased strain on the Plantar Fascia which can cause heel pain. Excessive pronation has frequently been suggested as a risk factor for the development of a number of overuse injuries of the lower limb. According to a study done in 2015, it was suggested that higher degrees of foot pronation also have an impact on the standing balance of the individual ⁽⁷⁾.

VI. CONCLUSION-

It can be concluded from this study that the majority of the studied sample size had altered Foot Posture. Hence, there was a significant change in the foot posture of the Bus Conductors.

VII. LIMITATIONS-

The main limitation of the study was the small sample size.

VIII. REFERENCES-

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