



ASSESSMENT OF FOOT POSTURE IN PREGNANT AND NON PREGNANT WOMEN OF SAME AGE GROUP USING FOOT POSTURE INDEX

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ABSTRACT

Objective: To compare the foot posture of pregnant women with the control group of non-pregnant women of same age group using foot posture index.

Background: Pregnancy leads to the permanent changes in foot which leads to many musculoskeletal problems.^(1,2) Early assessment of foot may help to prevent many postural problems associated with pregnancy. Studies had been conducted for assessment of posture in pregnant women specially spine posture. There is dearth in the literature regarding assessment of foot posture individually using foot posture index. A number of different methods have been described in the literature to quantify or classify standing foot posture. The Foot Posture Index (FPI) has been proposed as a fast, simple method of visually classifying foot postures as pronated, supinated or normal based upon six different visual foot posture criteria.⁽²⁾

Methodology: Total 60 women were taken by convenient sampling i.e. 30 pregnant women and 30 non-pregnant women. Written consent form was taken in the language best understood by them. Women were assessed according to 6 criteria of foot posture index.

Result and Conclusion: Data was collected and analysed. Unpaired t test was used to compare foot posture in pregnant and non-pregnant women to find out significance. P value (p=79) is statistically not significant. Thus there is no difference in foot posture of pregnant and non-pregnant women.

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INTRODUCTION

Women's feet changes during pregnancy owing to hormonal and anatomical changes not only confined to reproductive system but also to all systems of body, thus having strong influence on decrease in their quality of life. It had been observed in previous studies that from 2nd trimester women's body show significant changes⁽¹⁰⁾

Also there is a pregnancy hormone known as relaxin which is produced by ovaries, breast and also by placenta during pregnancy. It is produced mainly by corpus luteum in both pregnant and non-pregnant women. It rises to a peak at 14th day of menstrual cycle and from 12th week of pregnancy. Its primary function is to mediate hemodynamics changes that occur during pregnancy and also it loosens the ligaments of birth canal and pelvis. It also loosens the ligaments that support feet which may result in problems such as sprained ankles, low back pain, hip pain, knee pain etc.^(5,6)

Foot Posture Index⁽²⁾

FPI-6 is a novel method of rating the foot posture using the following criteria,

1. Talar head palpation
2. Supra and infra lateral malleolar curvatures
3. Calcaneal frontal plane position[inversion/eversion]
4. Bulging in the region of talonavicular joint
5. Height and congruence of medial longitudinal arch
6. Abduction and adduction of forefoot on rearfoot

It is a clinical tool used to quantify to which a foot is pronated, neutral or supinated. It is quick and simple to perform and allows multiple plane evaluation. It is a measure of standing foot posture so it is not a replacement for a gait assessment.⁽⁹⁾

MATERIAL AND METHOD

Study Design

Type of study: Control study.

Duration of study: 1 year.

Place of study: Maternity hospitals, metropolitan city.

Study Design

Sample size: Group A- 30

Group B -30

Sample population: pregnant and non-pregnant women

Sampling: Convenient.

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Selection criteria

Inclusion criteria

1. Females of age group of 20 to 30 years.
2. Group A- primigravida 12 weeks onwards
3. Group B-nulligravida women
4. Women who are willing to participate.

Exclusion Criteria

1. Obesity ⁽⁷⁾
2. Dancers ⁽¹¹⁾
3. Athletes ⁽⁴⁾
4. Individual with recent lower limb injury < 6 months
5. Individual working for prolonged standing >8hours ⁽¹⁾
6. Individual unwilling to participat

Material Used

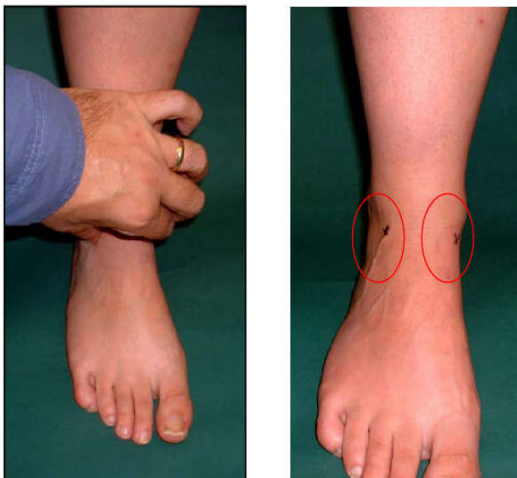
- Marker
- Foot posture index.

Procedure

The participants were recruited as per the inclusion criteria and the procedure was explained in detail. A written consent had been taken from the participants in the language best understood by them.

Talar Head Palpation

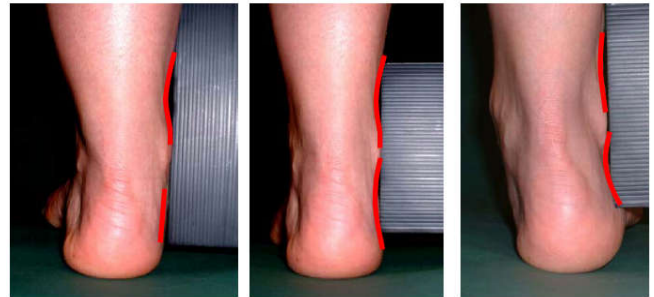
Diagram showing the position of the fingers when palpating of the head of the talus. The circles indicate the precise point of palpation on the medial and lateral side.



Score	-2	-1	0	1	2
	Talar head palpable on lateral side/ but not on medial side	Talar head palpable on lateral side/ slightly palpable on medial side	Talar head equally palpable on lateral and medial side	Talar head slightly palpable on lateral side/ palpable on medial side	Talar head not palpable on lateral side/ but palpable on medial side

Supra and Infra Lateral Malleolar Curvatures

Supinated (-2) Neutral (0) Pronated (+2)

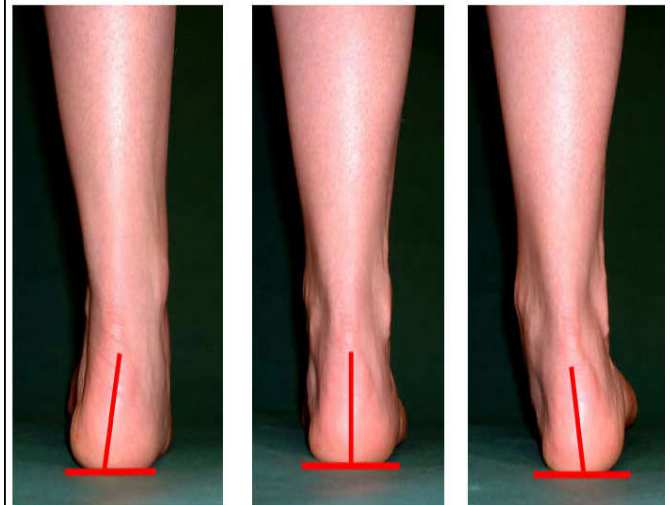


Score	-2	-1	0	1	2
	Curve below the malleolus either straight or convex	Curve below the malleolus concave, but flatter/ more shallow than the curve above the malleolus	Both infra and supra malleolar curves roughly equal	Curve below malleolus more concave than curve above malleolus	Curve below malleolus markedly more concave than curve above malleolus

Calcaneal frontal Plane Position

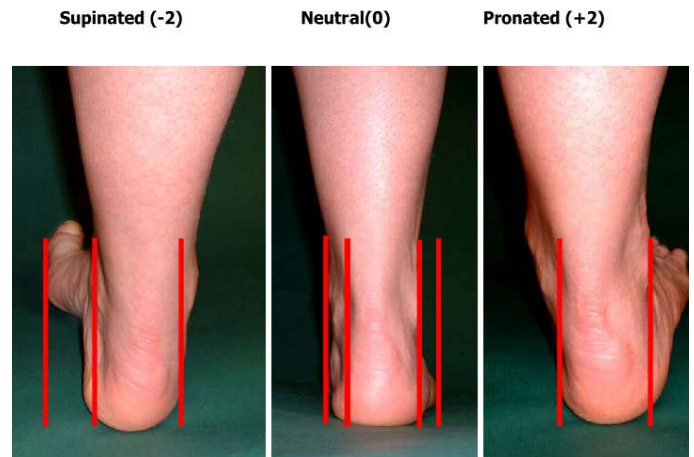
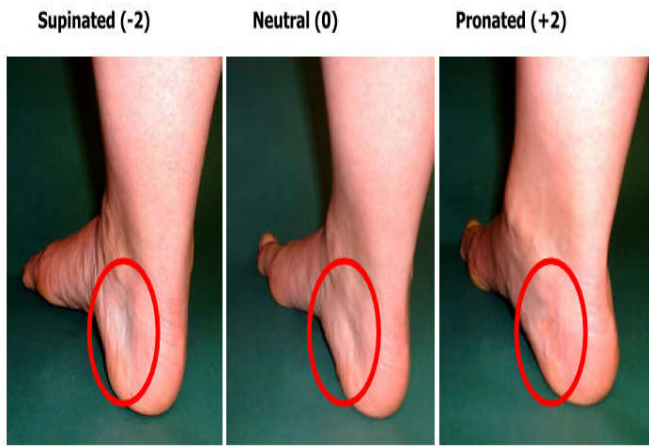
(Inversion /Eversion of Calcaneus)

Supinated (-2) Neutral (0) Pronated (+2)



Score	-2	-1	0	1	2
	More than an estimated 5° inverted (varus)	Between vertical and an estimated 5° inverted (varus)	Vertical	Between vertical and an estimated 5° everted (valgus)	More than an estimated 5° everted (valgus)

Bulging In the Region of Talonavicular Joint



Score	-2	-1	0	1	2
	Area of TNJ markedly concave	Area of TNJ slightly, but definitely concave	Area of TNJ flat	Area of TNJ bulging slightly	Area of TNJ bulging markedly

Score	-2	-1	0	1	2
	No lateral toes visible. Medial toes clearly visible	Medial toes clearly more visible than lateral	Medial and lateral toes equally visible	Lateral toes clearly more visible than medial	No medial toes visible. Lateral toes clearly visible

Height and Congruence of medial longitudinal arch

Neutral (0)



This observation should be made taking both the arch height and the arch congruence into consideration.

Supinated foot (-2)



Pronated foot (+2)



Score	-2	-1	0	1	2
	Arch high and acutely angled towards the posterior end of the medial arch	Arch moderately high and slightly acute posteriorly	Arch height normal and concentrically curved	Arch lowered with some flattening in the central portion	Arch very low with severe flattening in the central portion – arch making ground contact

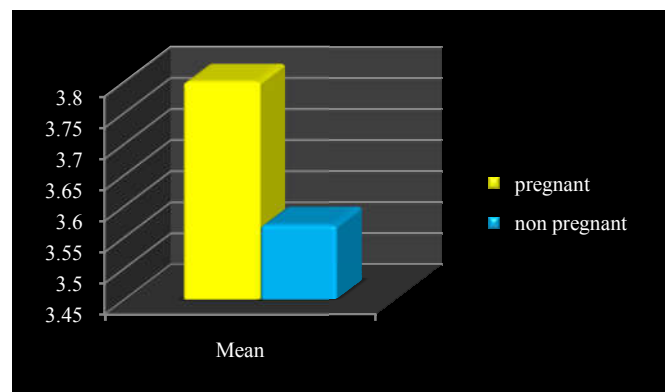
Abduction/adduction of forefoot on rearfoot

RESULTS

The present study aimed to compare the foot posture by foot posture index with the control group of non-pregnant women. Total 60 women were taken by convenient sampling i.e. 30 pregnant women and 30 non-pregnant women. The statistical analysis was done using unpaired- t test from which the p value of 0.79 is obtained. The given graph concludes that there is no significant difference in foot posture in pregnant subjects compared to non-pregnant control group.

Graph

Variation in foot posture index in pregnant and non-pregnant females.



	Pregnant group	Non-pregnant group
Sample size	N=30	N=30
Mean of dominant foot posture index	3.8	3.57

Interference: The above data states that there is no significant difference in foot posture of pregnant and non-pregnant group.

DISCUSSION

The purpose of this study was to compare the foot posture by foot posture index in pregnant and non-pregnant women of same age. Individuals working for prolonged standing, with recent lower limb injuries, dancers, athletes, subjects with obesity were excluded.

A number of different methods have been described in the literature to quantify or classify standing foot posture. The Foot Posture Index (FPI) has been proposed as a fast, simple method of visually classifying foot postures as pronated, supinated or normal based upon six different visual foot posture criteria. The FPI has demonstrated moderate to good intra-rater and inter-rater reliability as well as criterion validity. Furthermore, classification of foot posture based upon the FPI has shown an association with the development of various overuse injuries of the lower extremity. The FPI has also been shown to have both a weak as well as a strong relationship to dynamic foot function. Thus the FPI had been chosen as an assessing tool for this study.⁽⁸⁾

It was considered that there will be significant difference in foot posture in pregnant subjects because of pregnancy related hormonal and anatomical changes.

The result of the study showed that there is no significant difference in foot posture index in pregnant and non-pregnant women. This may be due to poorly chosen and incorrectly fitting footwear can impact negatively on our feet. Shoes with higher heels, poor grip and inappropriate or absent fastenings have been linked to impaired walking, balance and falls, while foot constriction within shoes can create temporary numbness.⁽³⁾ If footwear is incorrect then short term problems can become long term ones with an unwillingness to pursue activities such as walking or even affect the ability to work in a chosen occupation with consequent mental, emotional and physical implications. Lumbar spinal muscle action can be exacerbated, leading to overuse with eventual stiffening and resulting in postural changes. Also, possible lumbar intervertebral disc compression (as a result of poor footwear) can lead to lower back pain. The wrong pair of shoes can cause permanent damage to your body further down the line, and resulting problems aren't just limited to your feet. It can also cause collapsed arches. Hence such results may be because of wrong footwear, busy lifestyle of control group compared with pregnant subjects.⁽³⁾

CONCLUSION

The study concluded that there is no difference in foot posture of pregnant and non-pregnant women.

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