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Original Research Article

FOOT POSTURES: RELATION WITH FAMILY HISTORY AND FOOT WEARS

Arthi Ganapathy *[1], Sadeesh T [2], Raghuram Kuppusamy [3].

*[1] Senior Resident, Department of Anatomy, All India Institute Of Medical Sciences, New Delhi, India.

[2] Assistant Professor, Department of Anatomy, Mahatma Gandhi Medical College, Puducherry, India.

[3] Senior Resident, Department of Surgical Oncology, All India Institute Of Medical Sciences, New Delhi, India.

ABSTRACT

Introduction: Development of different foot types (normal, high and low arch) is influenced by factors like weight, height, family history. Studies have shown that the age at which a person starts wearing foot wear affects foot posture. Not many studies have focused on the effect of type of foot wear worn by the individuals (high, low heel or flat) on the foot posture. Accurate classification of the type of foot in a specific age group is important as the type of foot wear worn also change with age of a person.

Aim: The aim of the present study is to relate the different types of foot with the type of footwear worn by the individual and family history in young adult individuals.

Methods: foot prints of 250 volunteers were taken on a paper and visually assessed for the type of foot arch. The type of foot wear worn and the duration was noted and family history of abnormal foot type was also noted.

Statistical analysis: relation of the study group with various parameters was done using Chi square test and ANOVA.

Results: relation of different types of foot wear worn by the individuals with different types of foot was not statistically significant. There was a significant relation of family history of foot abnormalities with different types of foot arch noted.

Conclusion: Foot postures strongly correlate with the family history of an individual but the type of foot wear worn does not significantly influence the foot posture in adult age group.

KEY WORDS: Foot Types, Foot Arch, Foot Wear, Foot Abnormalities.

Address for Correspondence: Dr. Arthi Ganapathy, Senior Resident, Department of Anatomy, All India Institute Of Medical Sciences, New Delhi, India. **E-Mail:** arthiganapathy08@gmail.com

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INTRODUCTION

Foot postures depend on the integrity of medial, lateral and transverse arches of foot [1]. These postures vary with age of an individual [2]. Some types of foot postures put strain on the joints and ligaments of lower limb leading to functional restriction of limb movements. The commonest of altered foot posture is pes planus that is flat foot. Pes cavus also predisposes persons to abnormal gait postures and predisposes to injuries [3]. There are various factors that influence the type of foot especially pes planus.

These include age, weight, height, family history etc [4]. Early detection of abnormal foot types can facilitate the treatment patterns as in initial stages these can be rectified by foot exercises hence avoiding or delaying the requirement of corrective surgeries [5]. It has been shown in literature that the age at which a person starts wearing foot wear also affects the foot posture. A study conducted by Sachithanandham et al [6] in 1846 adults has shown higher rates prevalence of flat foot in individuals who have started wearing foot wear before the age of 6 years.

Similar findings were reported by Rao et al [7]. In their study they have also shown higher prevalence of flat foot in children who have started wearing shoes in early childhood. Lee et al [8] have described the importance of foot wear history in case of patients with adult flat foot. Not many studies have focused on the effect of type of foot wear worn by the individuals (high, low heel or flat) on the foot posture. With the present study an attempt has been made to find out if there exists any correlation between the type of foot and foot wear worn by the individuals.

A strong association of family history and type of foot posture has been reported in literature. A positive family history of flat foot increases the risk of development of similar abnormalities in the individual [9,10]. Pes cavus can also have a hereditary aetiology when its presentation is bilateral and associated with neurological symptoms [11].

Accurate classification of the type of foot in a specific age group is important as the parameters like height; weight and type of foot wear worn also change with age of a person. Hence while analyzing the prevalence of different types of foot structures in a specific age group these variables should also be included.

The aim of the present study is to correlate the different types of foot with the type of footwear worn by the individual and family history in young adult individuals.

MATERIALS AND METHODS

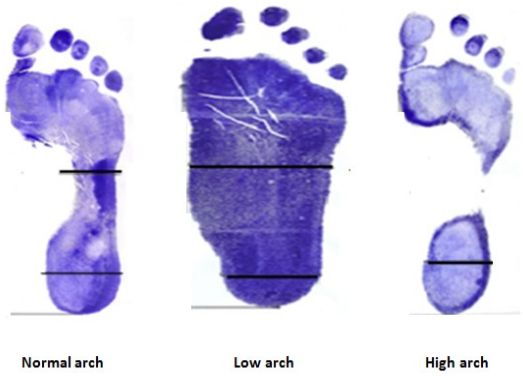
The study was conducted in the department of Anatomy Mahatma Gandhi medical college Pondicherry after getting approval from IHEC. Young adults in the age group of 18 to 24 years were included in the study (n=250). After getting the informed written consent from each volunteer they were made to sit on a chair and the foot brought in contact with the foot impression ink pad. Each individual foot impression of both right and left feet was taken on white sheets in sitting and standing position. The foot impression was then visually classified into normal, high and low arch foot type. Type of foot wear worn by the individual and the duration for which it was worn were recorded. Relevant family history was noted.

Statistical analysis: The data collected was first tabulated in Microsoft excel worksheet and analyzed using SPSS software version 16.0 for maximum, minimum, mean and standard deviation of all the measurements taken. Correlation of the study group with various parameters (footwear worn and family history) was done using Chi square test and ANOVA for calculating the statistical significance.

RESULTS

Foot prints of the participants were examined for different types of foot. Out of the 250 participants, 232 (92.8%) participants had normal foot, 13(5.2%) had bilateral flat foot and five participants (2%) had bilateral high arch foot (Fig 1). Unilateral flat foot or high arch foot was not observed in the study group.

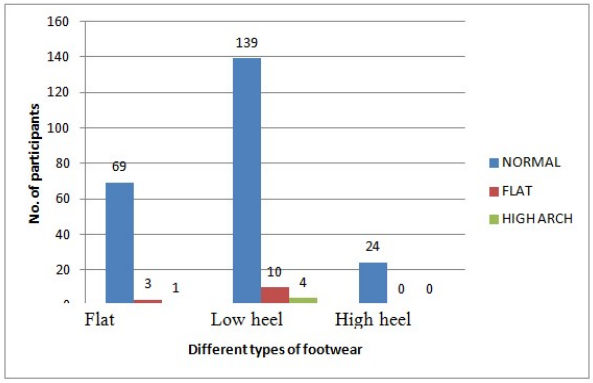
Fig. 1: Showing the different arches.



Correlation of different types of foot wear worn by the individuals with different types of foot: Footwear worn by the participants were classified as either low heel (< 2.5 inch), high heel (> 2.5 inch) or flat foot wear and the duration for which it was worn were divided into three groups (<2yrs , 2- 5yrs and >5 yrs). In the normal foot group (n=232, M=99, F=133), 69

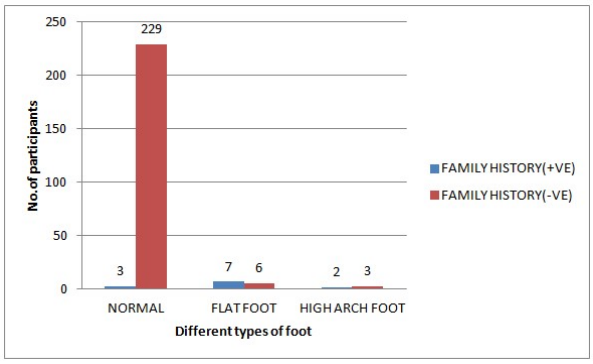
participants had worn flat foot wear, 139 participants had worn low heel foot wear and 24 participants had worn high heel foot wear. In the flat foot group (n= 13,M=8,F=5), 3participants had worn flat foot wear for more than 5yrs. Ten participants gave history of wearing low heel foot wear. Among them 9 gave a history of wearing the foot wears for more than 5yrs duration and one gave a history if wearing it for less than 2yrs. In the high arch group (n=5,M=2,F=3), 1 participant had worn flat foot wear for more than 5yrs duration and 4 had worn low heel foot wear for more than 5yrs. The correlation of different types of foot wear with the different foot types was not statistically significant (p value=0.54) (Fig 2).

Fig. 2: Showing the distribution of different types of footwear worn by participants with different foot types.



Correlation family history of abnormalities of foot with different types of foot: A family history of foot deformity was reported by 12 of the 250 participants. Out of 232 (M=99,F=133) participants who had normal foot 3 of them reported to have a positive family history. One among the three reported a flat foot deformity in his sibling, another reported polydactyly of left foot in his sister while the third reported a forefoot valgus deformity in his father. Seven out of 13 (M= 8, F=5) participants who had flat foot reported the presence of similar foot deformities in their families. Five out of these seven participants reported a history of flat foot in their father, one reported flat foot in his elder brother while another participant reported presence of flat foot in his elder sister. Also 2 out of 5 (M=2, F=3) participants who had high arch foot reported a positive family history. One among the two reported a history of poliomyelitis affecting both lower limbs in her father while the other reported a history of weakness of left lower limb in his father. Hence the participants, who had positive family history of deformities of foot, had higher chances of developing similar deformities. This was statistically proven significant (p value =0.00) (Fig 3).

Fig. 3: Showing the no. Of participants with positive and negative family history of foot deformities.



DISCUSSION

Foot wear use is an external factor that influences the plantar arch [12]. In the present study different foot types were correlated with different types of foot wear worn by young adult individuals i.e. flat, low heel and high heel foot wear. The duration of wearing the footwear was also noted. No significant correlation was found between the types of foot wear worn and the foot types. Studies comparing the effect of barefoot walking and use of footwear [13], effect of age at which a child starts wearing footwear have been done in the past [6,7].

After a thorough literature review the exact influence of different types of foot wear (flat, low and high heel) on different types of foot could not be established clearly.

Pezzan et al [12] assessed the relationship between foot posture and plantar arch among adolescent wearers and non wearers of high heeled shoes in 36 female adolescents aged 13 to 20years. Results showed no correlation between foot posture and type of plantar arch between the two groups studied by them. In the present study out of 5 participants who had high arch foot no one wore high heel foot wear. Also out of 24 persons who wore high heel foot wears no one had high arch foot or flat foot. No significant correlation was observed between the foot wear worn by the individuals and different types of foot similar to the study done by Pezzan et al [12].

Correlation of family history with prevalence of different foot types was determined in the present study. In their respective studies on how to approach pediatric flat foot Halabachi et al [14] and Edwin et al [10] have mentioned the importance of family history in determining the occurrence of foot abnormalities in a person. Abdel-Fattah et al [9] in a cross-sectional study of 2100 Saudi Arabian army recruits aged 18 to 21years found a strong association (OR ¼ 8.06,95%CI ¼ 4.55–15.25) between family history and the prevalence of flat foot. In the present study, out of 13 participants with flat foot 7 reported to have history of flat foot in their families. This correlation was found to be statistically significant (p value=0.00) confirming a strong association between family history and the prevalence of flat foot as observed in the above mentioned study.

According to Piazza et al [11] pes cvaus can be a common finding in general population but when a person presents with bilateral high arch foot a family history hereditary neuropathy should be elicited. In the present study two out of five participants who had high arch foot reported to have foot deformities in their families. One among the two reported a history of poliomyelitis affecting both lower limbs in her father while the other reported a history of weakness of left lower limb in his father.

CONCLUSION

Foot postures strongly correlate with the family history of an individual. Hence even though all infants have flat foot a positive family history may indicate that the flat foot may persist into adult life. Hence children with flatfoot having a positive family history should undergo tendon strengthening exercises regularly. Children with pes cavus should be thoroughly examined for any neurological deficits. From the findings of the present study it may be concluded that type of foot wear worn does not significantly influence the foot posture in adult age group. A further study with a larger subject group and longer duration of foot wear use is warranted to find out an association.

Conflicts of Interests: **None**

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