

Original Research Article

To establish association between age, sex, BMI and flat foot

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Abstract:

Background & Method: The aim of the study is to establish association between age, sex BMI and flat foot. The parents or the caregivers of the subjects under study were explained the purpose of study and written consent was obtained from the parents or the caregivers. A plastic platform with a plane paper which is immobilized with the help of clips is kept on smooth surface. The child is seated in front of the platform and the foot to be studied is equally impregnated with stamp ink with the help of roller and requested child to put this foot on to the platform but opposite foot out of platform now child is asked to stand up and perform a small flexion of the ipsilateral knee and then go back to initial position removing the foot from the platform.

Result: Observation shows that correlation between BMI and plantar arch index PI is significant for both the sides with correlation value 0.31 for right side and 0.49 for left side and $p < 0.05$ for both the side.

Conclusion: Foot print of both the foot of every subjects were taken by using Staheli's plantar arch index method and PI values were calculated. The study concluded that incidence of flat foot deformity is higher in the boy than girls and incidence of flat foot decreases with increase in age. From the present study it is also concluded that higher PI are expected in lower age group.

Keywords: age, sex, BMI and flat foot.

Study Designed: Observational Study.

1. Introduction

Bones of the foot begins with talus / ankle bone two bones of lower leg, large tibia and smaller fibula comes together to forms ankle mortis. Two bones that forms the back part of the foot (hind foot) are talus and calcaneus / heel bone. Talus connected to calcaneus at subtalar joint ankle joint allows foot to bend up and down. Subtalar joint allows foot to rock from side to side.

Flat foot deformity or pes planus is the most common foot Pathology in patients of all ages^[1]. body weight is borne through two half columns of the foot with the medial border of each foot raised from the ground^[2]. The resulting arch may be high or the low, yet still be healthy, but it has collapsed in case of flat foot.

An apparent flat foot (fat foot) is present in many children up to the age of 2 years because of the presence of a fat pad in the area of longitudinal arch. In weight bearing fat pad atrophies and normal arch appear^[3].

Flexible flatfoot is a condition in which the arch of the foot shrinks or disappears upon standing. Upon sitting or when the child is on tiptoes, the arch reappears. Parents and other family members often worry needlessly that an abnormally low or absent arch in a child's foot will lead to permanent deformities or disabilities^[4]. Most children eventually outgrow flexible flatfoot without any problems. The condition usually is painless and does not interfere with walking or sports participation.^[5]

2. Material & Method

Present study entitled "To establish association between age, sex BMI and flat foot" studies was conducted on 200 children of age group between 5-11 years. The 200 children were selected from the department of GMC, Secundrabad and other private hospitals of the city attending the OPDs for the complaints of the foot.

The parents or the caregivers of the subjects under study were explained the purpose of study and written consent was obtained from the parents or the caregivers. A plastic platform with a plane paper which is immobilized with the help of clips is kept on smooth surface. The child is seated in front of the platform and the foot to be studied is equally impregnated with stamp ink with the help of roller and requested child to put this foot on to the platform but opposite foot out of platform now child is asked to stand up and perform a small flexion of the ipsilateral knee and then go back to initial position removing the foot from the platform. Measurement is taken by measuring scale. By using foot print Staheli's plantar arch index (SPAI) was calculated as a line drawn tangent to the medial forefoot edge and at heel region.

INCLUSION CRITERIA

- Children attending the OPD with foot problems and apparent flat foot.

EXCLUSION CRITERIA

- Subjects with age group below 5 year and above 11 years.
- Orthopedic surgeries or serious traumas on limbs.
- Relevant clinical condition like palsy sequels, myelomeningocele, meningitis sequels.etc.

3. Results

Table No. 1 Distribution of study and control groups according to Age and sex:-

Age Groups in years	Study group		Control group		Total no of subject
	Boys	Girls	Boys	Girls	
Group I / 5 -7 years	20	10	16	16	62
Group II / 7-9 years	20	18	16	18	72
Group III / 9-11 years	18	14	18	16	66
Total = 200	58	42	50	50	200

Subjects were distributed in 3 age groups. In age group I (5-7 years) total 62 subjects were included (36 boys, 26 girls). In age group II (7-9 years) total 72 subjects were included (36 boys and 36 girls). In age group III (9-11) total 66 subjects were included (36 boys and 36 girls).

Table No. 2: Distributions of study population into obese and non-obese according to BMI percentile:-

Age groups	Boys		Girls		Total
	Obese	Non obese	Obese	Non obese	
Group I / 5 - 7 years	10	26	08	18	62
Group II / 7- 9 years	12	24	08	28	72
Group III / 9- 11 years	10	26	06	24	66
Total	32	76	22	70	200

Anthropometric measurements were carefully recorded in all subjects and on the basis of BMI percentile subjects are distributed into obese and non-obese in all age groups

Table No. 3: Correlation between BMI and plantar arch index value for case group:-

	Correlation value	P value	Significant level
Rt. Feet	0.31	P<0.05	significant
Lt. feet	0.49	P<0.05	significant

Observation shows that correlation between BMI and plantar arch index PI is significant for both the sides with correlation value 0.31 for right side and 0.49 for left side and $p < 0.05$ for both the side.

4. Discussion

Lee MS, Vanore et al^[5] in (2010) they did a study entitled "Diagnosis and treatment of adult flatfoot." This study conducted on elementary school children in Taiwan to determine the prevalence of flexible flatfoot. A sample of 2,083 children, between 7 and 12 years of age was used. The presence of flatfoot determined by footprint analysis. The results of this study indicate that the prevalence of flexible flatfoot is highest in the age range of 7 to 8 years.

From the observations of the present study obesity has been found definitively associated with flat foot deformity, result shows that out of 27 obese study subjects 59.2% subjects had flat foot. This study is also supported by the studies of :-

Adoración Villarroya M et al^[7]. Studied foot structure in overweight and obese children. A cross sectional study was conducted on 245 children from four randomly selected schools of Zaragoza Spain. They observed that the normal weight group indicated the presence of normal MLA (medial longitudinal arch). However in the overweight an intermediate MLA and in obese group a low MLA was observed.

Angela M Evans^[8] (2011) did study on 140 Australian school children aged 7-10 years to find out association between the paediatric flat foot and general anthropometry. In contrast to, previous studies results of this study shows that heavy children have less flat feet. Results this study is contradictory to the observations of the present study^[9].

5. Conclusion

Foot print of both the foot of every subjects were taken by using Staheli's plantar arch index method and PI values were calculated. The study concluded that incidence of flat foot

deformity is higher in the boys than girls and incidence of flat foot decreases with increase in age. From the present study it is also concluded that higher PI are expected in lower age group.

6. References

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