

## FOOT DEFORMITY FREQUENCY DEPENDENCE ON AGE AND GENDER

*Preliminary communication*

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### **Abstract**

*Proper body posture implies correct relationships among all segments of the body, and this is a condition of its functioning. Due to the plasticity and sensitivity of children's body proper postural status is of particular importance in the school period development in the first years of schooling. Postural status of school children in our country have been explored by many authors whose results differ somewhat, although still largely similar. A sample of this study were the elementary school pupils of both sexes from first to eighth grade primary schools "Stevan Dusanic-Pribinic", Teslic and "Dositej Obradovic", Blatnica-Teslic, Republic Serbska. The examination included 651 respondents, of which 310 girls and 341 boys. Analyzing the presence of foot deformities at the population research shows that the deformity of the first degree is present in 51.76% of cases, a deformity of the second degree is far less pronounced 17,35%, while the third degree is negligible. Deformity of the foot in the first degree is the most present in the seventh grade, followed by students in fourth and eighth grade and the least affected deformity within the fifth grade students.*

**Keywords:** *foot deformity frequency, elementary school*

### **INTRODUCTION**

The need for muscle exertion is becoming scarcer, and the intensity of these efforts ever smaller. The increase in many diseases, stress, physical deformities and more widespread obesity that sometimes outcome the operational procedure (Nimesh et al., 2007).

Until now, many studies dealing with the problem of assessment and possible spinal column deformities, selecting the best indicators and assessing the reliability of those procedures (Wickens & Kiputh, 1937; Stefanovic et al., 1972; Watson & Donncha, 2000; Straker & Mekhi, 2000; Pausic, 2006; McEvoy & Grimmer, 2005). All of the above research were carried out in order to detect the irregularities and deformities in children and adults.

The modern way of life and school obligations regime led to hypokinesia of students at school and at home. Hypokinesia first leads to a weakening of the energy exchange, then to the basic physiological systems and locomotor apparatus organism growing. The consequence of the above mentioned causes of the phenomenon of poor posture which, if not timely intervene and reveal (Nice, 1996) transformed into a deformity. If the hypokinesia is prolonged, the deviation begins and it can inexorably progress to severe fixed deformities. A the physical deformity of a child is permanently noticed, juveniles are more exposed to the impact and frequency of deformities (Friedel, Petermann et al., 2002; Beganovic & Besovic, 2012). Therefore, the primary task is to prevent the poor posture displaying and deformity in the early stages, and do everything to impede its further development.

The spinal column extends along the center line of the rear wall of the fuselage. As a relevant indicator takes the Frankfort plane, which is an indicator of regularities observed segments of the body (Keros & Cave, 1977). The locomotion is a separate body with static and dynamic function. It wears the head, supports the torso, surrounds and protects the spinal cord and participates in every movement of

the body. Over the pelvis it is connected to the lower extremities, so as it participates in their movements by transferring their weight to the body.

The foot is like the backbone of phylogenetically youngest part of the locomotive apparatus, which is not adapted to the new conditions of today's life and therefore in these segments in the highest percentage of the postural disorders occurring and as well as various physical deformities degree. Especially a high percentage of foot disorders reflects in form of lowered arches.

The static role of foot is reflected in taking the overall unit weight of the body, through the bones while transferring and distributing the weight on the basis pointing the support of the foot and therefore is subject to various changes in the normal foot status. The dynamic role is reflected in walking, running and in various forms of leaps. That means that the foot lifts the body from the ground in an appropriate manner, alleviates and amortize the contact with the ground and adapts to further action in various forms of movements. The foot deals with all this variety of negative influences that lead to deviations from normal the status. The flatfoot usually occurs at the school age in which a professor of physical education can have a significant impact.

The research results should obtain relevant indicators of the incidence of deformities and flat feet in students selected ages.

The access to data determining the deformities and flat feet should be taken responsible and seriously because only timely detection of deformities can be controlled, subject to appropriate treatment of physical exercise and operate effectively on the elimination of milder forms of deformities. The subject this study consists in determining the prevalence of foot deformities among pupils of primary school age and the presence of the deformity depending on age and gender. The aim of the research was to determine the presence of foot deformities

among pupils of primary school age, to determine the presence and existence of connection between the foot deformity depending on age, class as well as to determine the presence and existence of a connection between the deformities and pupil's sex.

## METHODS

A sample of this study were the elementary school pupils of both sexes from first to eighth grade primary schools "Stevan Dusanac-Pribinic", Teslic and "Dositej Obradovic", Blatnica-Teslic, Republic Serbska. The examination included 651 respondents, of which 310 girls and 341 boys. The instruments and techniques of measurement were performed in the hall for physical education classes in the morning, under artificial lighting and the optimum space temperature. At measurements of the respondents were in t-shirts, short shorts and barefoot. At determining the existence of foot deformity was performed by taking a footprints impressions. For the interpretation we used the Thomson's method.

For the flat feet determination, we have found a method prints and analysis plantogram which is one of the most acceptable and the most common of more preferred methods for determining the status of the arches of the foot.

The advantages of this method are numerous:

- enabling high degree of objectivity,
- it is relatively easy applicable to a larger number of respondents,
- while requiring no special conditions for its implementation,
- reliability and accuracy is quite large,
- well accepted by subjects,
- does not require large material costs,
- resulting prints can be kept for many years, which allows you to track the results of corrective measurement and comparison between different testing stages.

Methods of interpretation - Thomson's method.

This method indicates a change in the instep of the foot already in the initial stage, and the results which are presented as percentage values which allows us a precise statistical analysis.

The data processing methods are statistical significance between the categories of respondents to the indicators of control variables by calculating the Chi square test. The existence and size of the association between the studied area is calculated by Pearsons's correlation coefficient which in practice is working with the most commonly used linear models and contingency coefficient as a measure of association based on Chi squared test.

## RESULTS AND DISCUSSION

Table 1. presents the results of the presence of foot deformities depending on the affiliation class. Analyzing the presence of deformities of the foot in the studied population we see that the deformity of the first degree is present within 51.76% of the cases, deformity of the second degree is far less pronounced by 17,35% and a deformity of the third degree is negligible, while the correct feet found in 30,72% of the respondents.

Deformity of the foot in the first degree, the most present in seventh grade were 65.64%, followed by students in fourth and eighth grades 56,81% and 56,66% respectively, while the least affected students deformities were the fifth-graders 28.88%.

Deformity of the second degree is a lot more prevalent among the students of first, second and fourth grades, while in other grades less often, while its presence at least in the third and the seventh class. What the deformity of the third degree is concerned, we see that its presence is negligible in full.

Analyzing the correct foot in the populations examined by the class affiliation shows that the highest percentage of correct foot are in the fifth grade while the other classes are relatively uniform except for the fourth grade where the respondents reported at least with the right foot were 15.90%.

Table 1. Depending on results of the foot by subject's class

Class	Foot								Total	%
	Deformity 1 step	%	Deformity 2 step	%	Deformity 3 step	%	Correct foot	%		
I	33	38,82	26	30,58			26	30,58	85	100
II	20	41,66	12	25			16	33,33	48	100
III	18	52,94	3	8,82			13	38,23	34	100
IV	25	56,81	11	25	1	2,27	7	15,90	44	100
V	13	28,88	9	20			23	51,11	45	100
VI	40	47,61	15	17,85			29	34,52	94	100
VII	86	65,64	12	9,16			33	25,19	131	100
VIII	102	56,66	25	13,88			53	29,44	180	100
Total	337	51,76	113	17,35	1	0,15	200	30,72	651	100

Table 2. Depending on results of the foot by subject's class

Foot	Class								Total
	I	II	III	IV	V	VI	VII	VIII	
Deformity 1 step (%)	33	20	18	25	13	40	86	102	337
Deformity 2 step (%)	9,79	5,93	5,34	7,42	3,86	11,87	25,52	30,27	100
Deformity 3 step (%)	26	12	3	11	9	15	12	26	113
Correct foot (%)	23,01	10,62	2,62	9,73	7,96	13,27	10,62	23	100
Correct foot (%)	26	16	13	7	23	29	33	53	200
(%)	13	8	6,5	3,5	11,5	14,5	16,5	26,5	100
Total (%)	13,06	48	34	44	45	84	131	180	651
(%)		7,32	5,22	6,76	6,91	12,9	20,12	27,65	100

In Table 2. the results analyzed the presence of foot deformities depending on subject's class by observing the number of participants in the group deformity. Of 337 respondents from the first to the eighth grade in which the recorded defomity feet of first degree is the most pronounced in subjects axial grades of 30,27% and seventh class by 25.52%, while in the fifth grade at least of 3.86% and 5.34%, the third and the second grade of 5.93%. The second highest degree of deformity was recorded in the first and eighth grade while the presence of least recorded are in the third grade of 2.65%. Presence deformity of the third degree in the research population is not recorded. When analyzing the subjects in the group with the correct foot, we see that most of those with the proper feet are of the eighth grade, 26.5% followed by 16.5% respondents seventh and sixth grade 14.5% and at least the subjects with the correct feet 3.5% in the fourth, third, and 6.5% other 8% grades.

The values of the Pearson's Chi squared test of 59.62 in Table 3. as well as the value of the coefficient contingency of 0.29 in Table 4. at the level of significance from

Table 3. Feet - Pearson's Chi square tests

	Value	Df	Sig.
Pearson's Chisquare	59,62	21	0,00
N of Valid Cases	651		

0.00 indicate a statistically significant differences in the studied foot deformity depending on subject's class.

Table 5. presents the results of the foot, depending on the male subjects population gender. At correct feet are present in 26.98% of cases, while the percentage for the girls is 34.84%.

If we make an analysis of the presence of deformities by classes we see that at the male population of the fifth and the third class are most represented with correct feet while the girls to fifth class. At disorder in the first degree, the largest presence of foot deformities are in boys in the seventh and eighth grade, while in of the seventh and fourth class. Deformity of the second degree is most present in boys of the sixth and fourth grades while in girls the most present in the first, second and fourth grades.

The value of Person's Chi square test is 10.00 and contingent coefficient from 0.12 to 0.02 level of significance in Tables 6. and 7. show a statistically significant difference between the status of the foot by grade depending on subject's sex.

Table 4. Simetrics measures

	Value	Sig.
Nominal by nominal	0,29	0,00
Contingency coefficient		

Table 5. Depending on resultats of the foot male

Male	Def.orrnity 1step	%	Deformity 2 step	%	Deformity 3 step	%	Correct foot	%	%	
I	13	34,21	13	34,21			12	31,58	38	100
II	11	44	7	28			7	28	25	
III	10	58,82	1	5,88			6	35,29	17	
IV	10	47,62	6	28,57	1	4,79	4	19,05	21	
V	8	32	6	24			11	44	25	
VI	18	40,91	13	29,55			13	29,55	44	
VII	56	63,64	11	12,5			21	23,86	88	
VIII	50	60,24	15	18,07			18	21,69	83	
Total	176	51,61	72	21,11	1	0,29	92	26,98	341	

Depending on resultats of the foot Female

I	20	42,55	13	27,66			14	29,79	47
II	9	39,13	5	21,74			9	39,13	23
III	8	47,06	2	11,76			7	41,18	17
IV	15	65,22	5	21,74			3	13,04	23
V	5	25	3	15			12	60	20
VI	22	55	2	5			16	40	40
VII	30	69,77	1	2,33			12	27,91	43
VIII	52	53,61	10	10,31			35	36,08	97
Total	161	51,94	41	13,23			108	34,84	310

Table 6 Feet - Pearson's Chi square tests

	Value	Df	Sig.
Pearson Chi-square	10,00	3	0,02
N of Valid Cases	651		

Table 7 Feet - Pearson's Chi square tests

	Value	Sig.
Nominal by nominal	0,12	0,02
Contingency coefficient		
N of cases	651	

**CONCLUSION**

Analyzing the presence of foot deformities at the population research shows that the deformity of the first degree is present in 51.76% of cases, a deformity of the second degree is far less pronounced 17.35%, while the third degree of deformity is negligible.

Deformity of the foot in the first degree is the most present in seventh grade, followed by students in fourth and eighth grade and the least affected deformity is by the fifth grade students.

The deformity of second degree is a lot more prevalent among the students of first, second and of the fourth grade,

while in the other grades of much smaller but at least its presence is negligible or is not present.

In the male population the correct foot are present in 26.98% of cases, while in girls this percentage is 34.84%. The presence of deformities of the first degree in boys and girls is very similar and is slightly over 51%, with deformities of second degree which is almost twice as prevalent in men than girls and the deformity of the third degree, which virtually is zero.

The aim of this study is based on the obtained results which should initiate certain activities in order to foot deformities could timely diagnose, control and subordinate effectively by a programmed corrective exercise.

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