

POSTURAL DISORDERS IN SAGITTAL PLANE IN ADOLESCENTS OF PRIMARY SCHOOL AGE

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„A CHILD IS NOT A MINIATURIZED ADULT“

Morphological,
mental,

biochemical,

endocrine,
social,

and every other status, on the basis of which the individual is defined, shows a specific difference in a child in relation to an adult.

-In children, the phenomenon of growth is present faster / slower organic system

- Skeleton – grows until the age of 20/forms until the age of 23

Muscles – development until the age of 40

(Kolarov N. Dete i sport. Sportska Medicina, 2005, vol 5, br. 1: 22-26)

INDICATORS OF ADOLESCENCE DURATION

Biological age (to determine the beginning) and
social age (to determine the end of adolescence)

Authors dealing with adolescence talk about three stages:

early adolescence (11 -15)

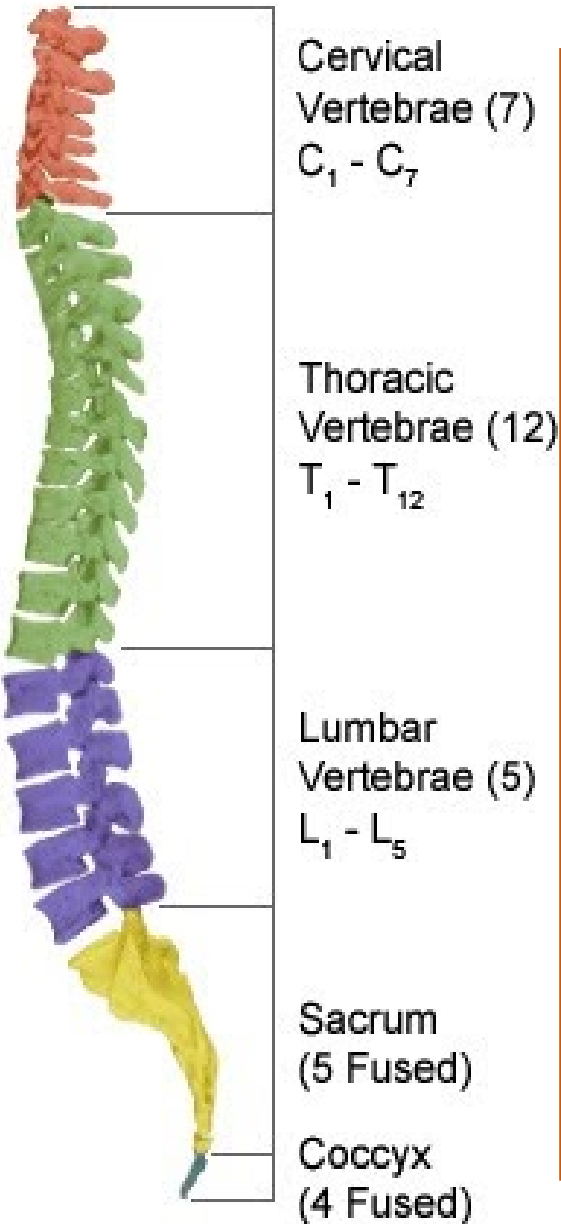
middle adolescence (15-17)

late adolescence (after 17 years),,

emphasizing that any division is arbitrary(Kimmel & Weiner, 1995).

- WHO defined adolescence as the period between the ages of 10 and 19, but four years later, the same organization proposed that the upper limit for this period be moved to the age of 24, believing that in many parts of the world young people do not achieve adult status or function as adults (taking responsibility and the role of adults) even after the age of 20 (Kapor-Stanulović)

Spinal Column Vertebrae

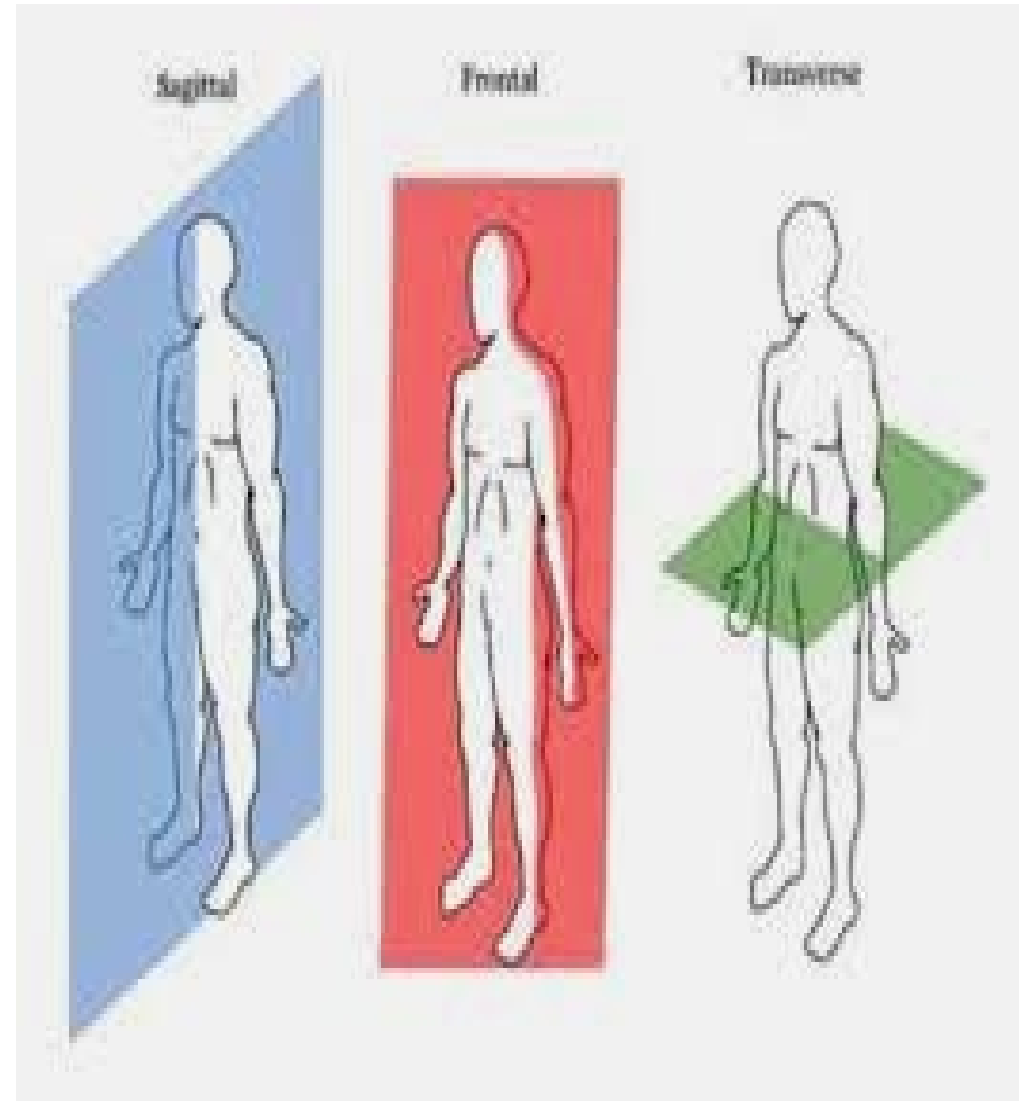


Anatomy of the spinal column

- „**Columna vertebralis**“ is situated along the median line of the posterior part of the trunk
- The upper end is connected with the skull, and the lower end is free.
- The formation of the spinal column begins in the embryonic age with: chorda dorsalis - ossifications form 33-34 vertebrae.
- The nucleus pulposus and discus intervertebralis represent the rest of the chorda dorsalis
- In the spinal column: flexio, extensio, lateroflexio, torsio.
- Flexion and extension: in the cervical and lumbar spinal column

SPINAL MOBILITY

- Spinal mobility takes place in the three planes: frontal, sagittal and horizontal (transverse).
- The vertebrae are connected with intervertebral discs and two ligaments lig. Interspinale et lig. Supraspinale
- Discus intervertebralis is fibrocartilaginous disc lying between adjacent surfaces of the bodies of the vertebrae
- The fibrous ring very tightly connects the epiphyses of the two vertebral bodies with oblique fibrous bundles



SPINAL POSTURE

The spinal column is the basis of good posture in terms of maintaining a normal upright posture against

gravity,

weight (exogenous factor)

and internal forces of the

organism,

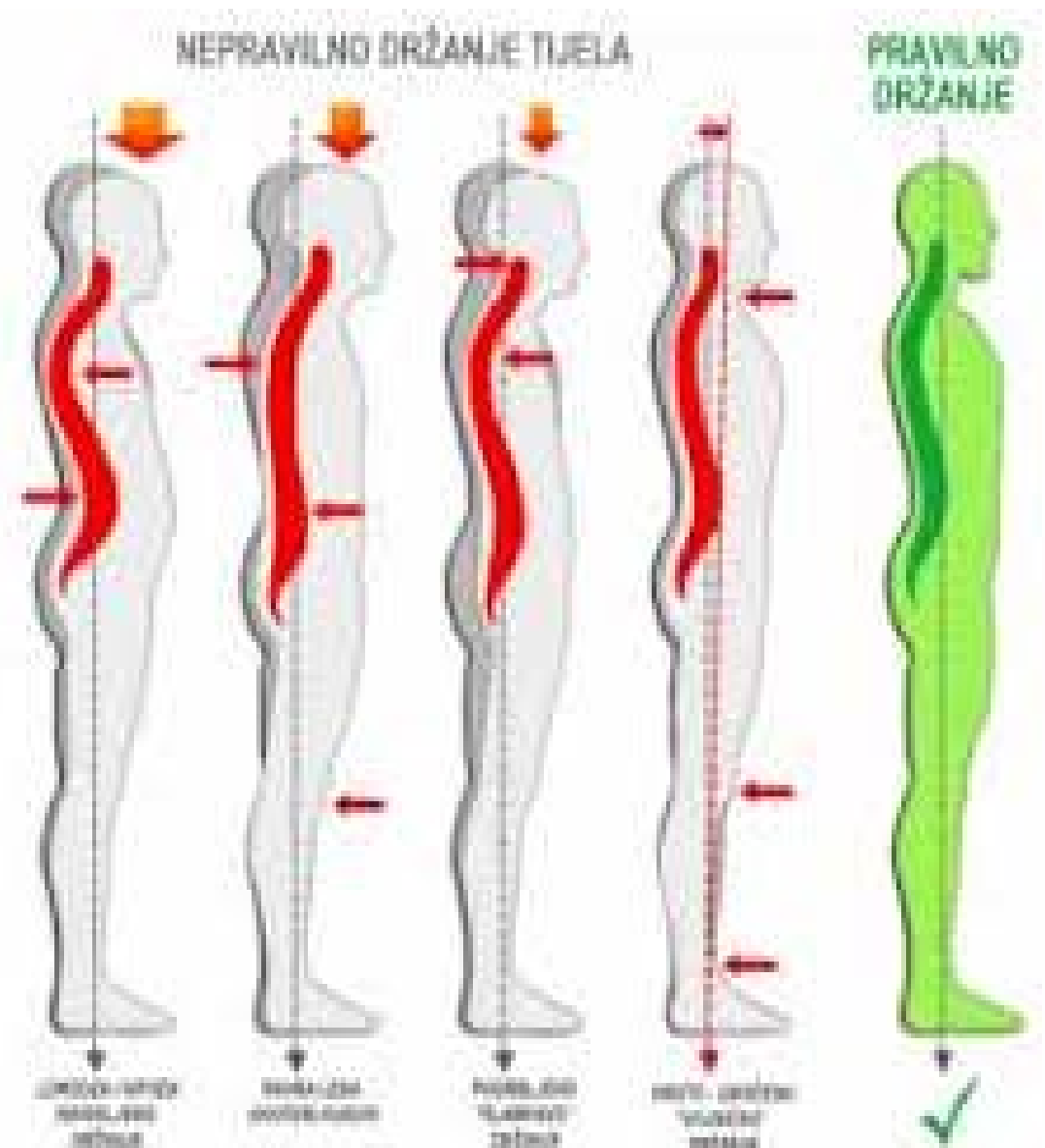
support for all body segments above and of the same height

FIRM

MOVABLE

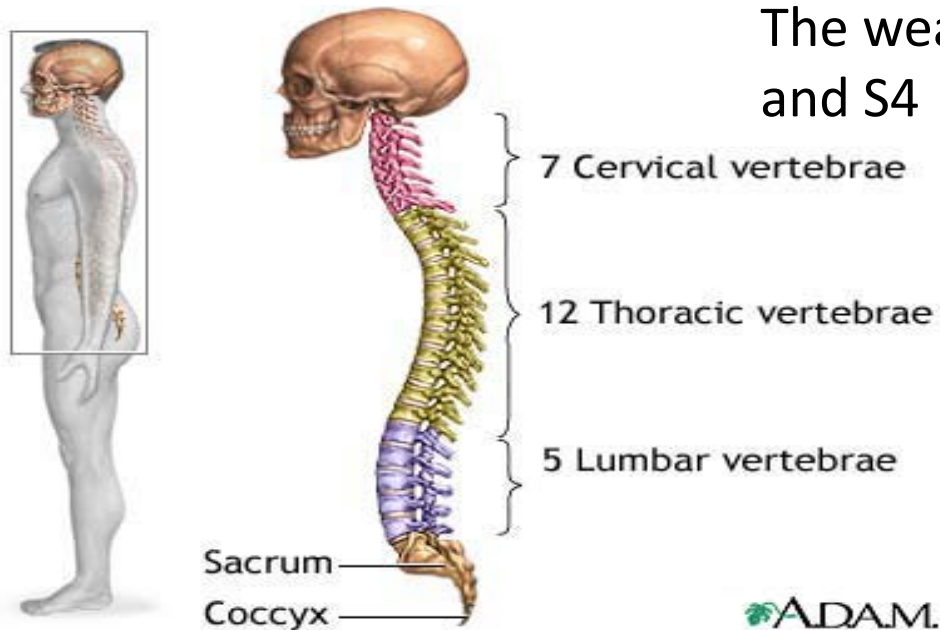
Vertebrae intervertebral discs fibrous connections

4 krivine 17 x jači ks



SPINAL COLUMN IN THE SAGITAL PLANE

- Cervical lordosis with concavity backwards
- Thoracic kyphosis with convexity backwards
- Lumbar lordosis with concavity backwards
- Sacrum coccyx curve with convexity backwards

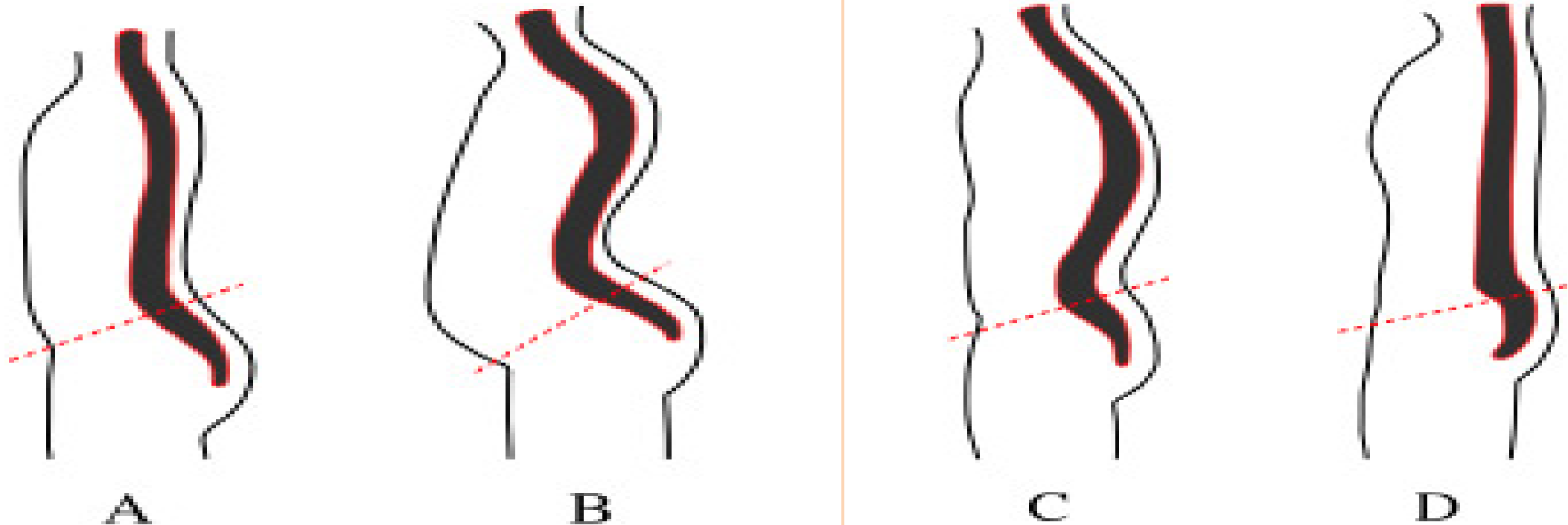


The weakest points of the spine : C6 and C7 ;Th6; L3 and L4 ;S3 and S4

Cervical lordosis
Thoracic kyphosis
Lumbar lordosis
Sacrum coccyx curve

INCLINATION

- Sacroiliac pelvic joint - movement - reaction of the rest of the spine
- The position of the sacral bone and pelvis in a standing position determined on the basis of inclination
- If the angle is increased- compensatory response of the spine- increased lumbar lordosis which leads to an increase in dorsal kyphosis and cervical lordosis



THE AIM OF THE STUDY

- The aim of the study is to determine the presence of postural disorders in the sagittal plane, as well as the relation of morphological and postural status of primary school adolescents.

MATERIALS AND METHODS

- The survey was conducted on a sample of 174 students of VI, VII and VIII grades. Of the total number of examinees, the male population consisted of 94 examinees and the female population of 80 examinees.(Primary school „ Vuk Karadžić“ and Primary school „Dubrava“)
- The sample of variables evaluating the postural status were variables for assessing spinal disorders: postural kyphosis and postural lordosis: PK and PL
- Morphological characteristics were assessed by variables: body height and body weight
- The basic method used through this research is the method of somatometry and somatoscopy, while the statistical method was used as an additional method, which determined the presence of postural disorders of the spine in the sagittal plane

DATA PROCESSING METHOD

- In theoretical research, when selecting the most commonly used tests in models for monitoring morphological status, and in relation to the type of postural disorders, the frequency distribution method is used, and the assessment of STATIC posture is performed by classical physiotherapeutic methods: inspection observation, measurement, comparison of these data.
- The obtained data were processed by using the descriptive and comparative statistical analysis and expressed in percentages.

Primary school „Vuk Karadžić“

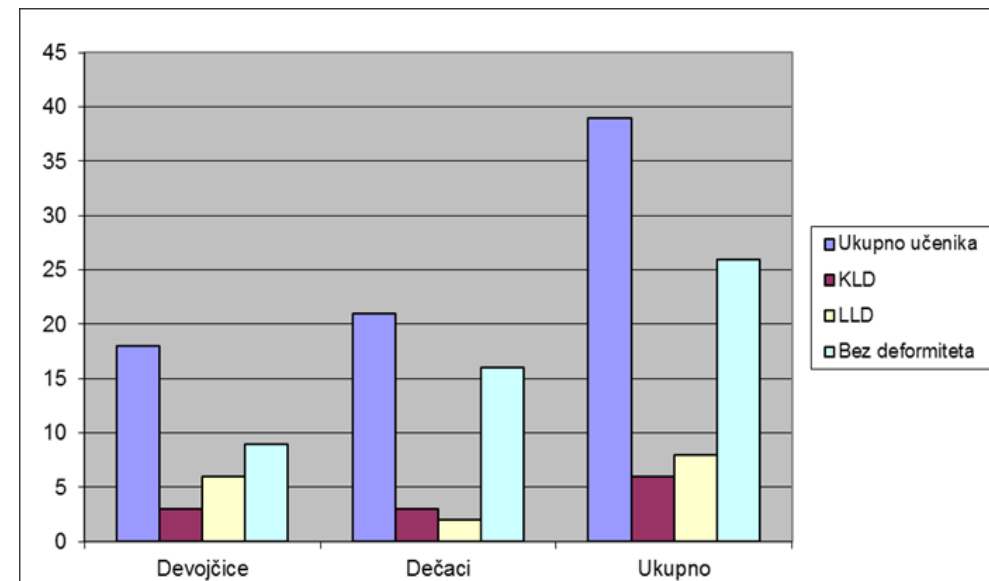
VI grade

gender	Total number of students	PK		PL		Without deformity	
		Br	%	Br	%	Br	%
girls	18	3	16,6	6	33,3	9	50,0
boys	21	3	14,2	2	9,6	16	76,2
total	39	6	15,3	8	20,6	26	64,1

Table 1:

PK: 16,6% (F) 14,2% (M).

PL: 33,3% (F) 9,6% (M).



Primary school „Vuk Karadžić“

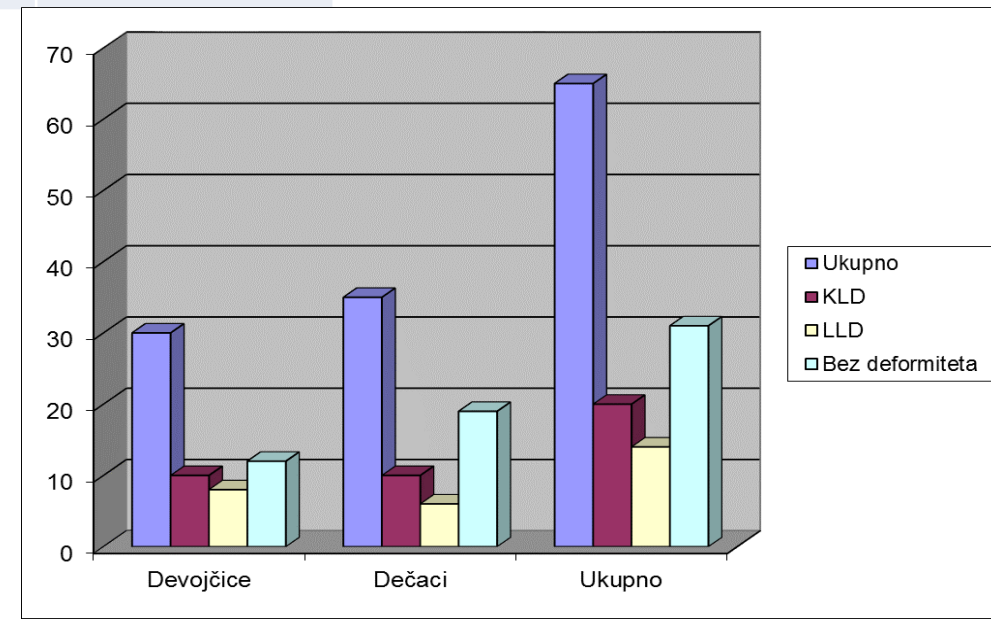
VII grade

gender	Total number of students	PK		PL		Without deformity	
		Br	%	Br	%	Br	%
girls	30	10	33,3	8	26,7	12	40,0
boys	35	10	28,6	6	17,1	19	54,3
total	65	20	30,7	14	21,6	31	47,7

Table 2:

PK: 33,3% (F) 28,6% (M).

PL: 26,7% (F) 17,1% (M).



Primary school „Dubrava“

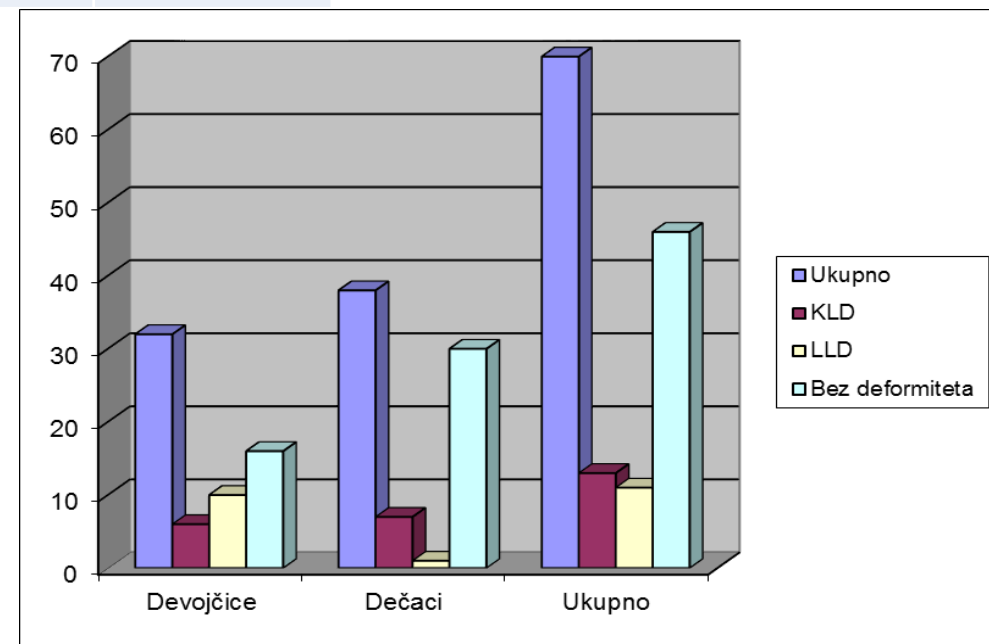
VIII grade

gender	Total number of students	PK		PL		Without deformity	
		Broj	%	Broj	%	Broj	%
girls	32	6	18,7	10	31,2	16	50,0
boys	38	7	18,4	01	2,6	30	78,9
total	70	13	18,6	11	15,7	46	65,7

Table 3:

PK: 18,7% (F) 18,4% (M)

PL: 31,2% (F) 2,6% (M)



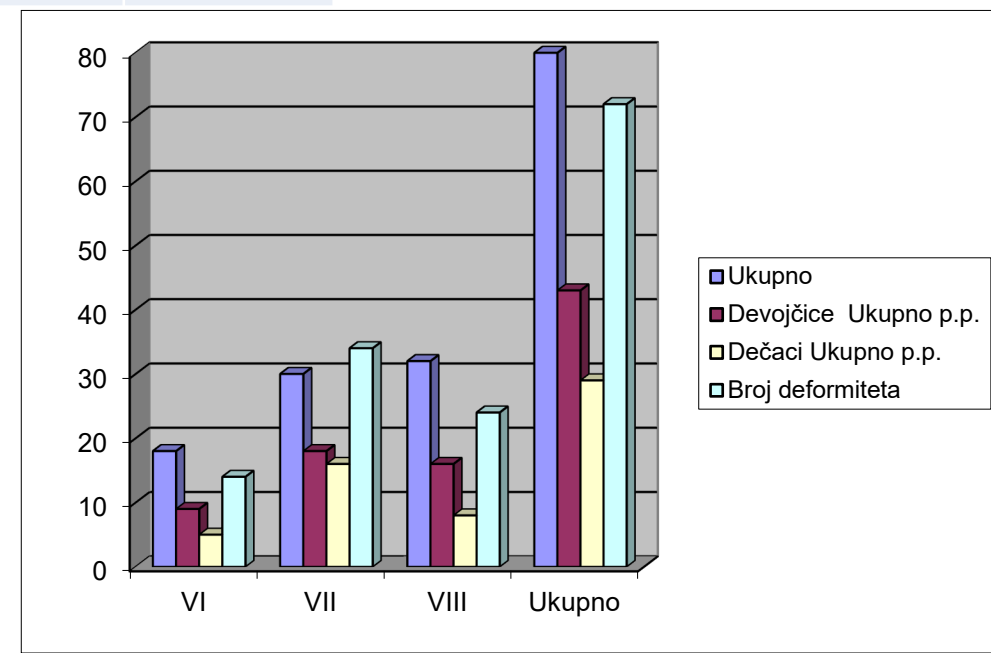
grade	girls		boys			Total number of deformity		
	total	Total post.disorders		total	Total post.disorders			
		Broj	%		Broj	%	Broj	%
VI	18	09	50,0	21	05	23,8	14	35,8
VII	30	18	60,0	35	16	45,7	34	52,3
VIII	32	16	50,0	38	08	21,1	24	34,2
total	80	43	53,7	94	29	30,8	72	41,3

Table 4:

PK and PL present in 41,3% of adolescents -

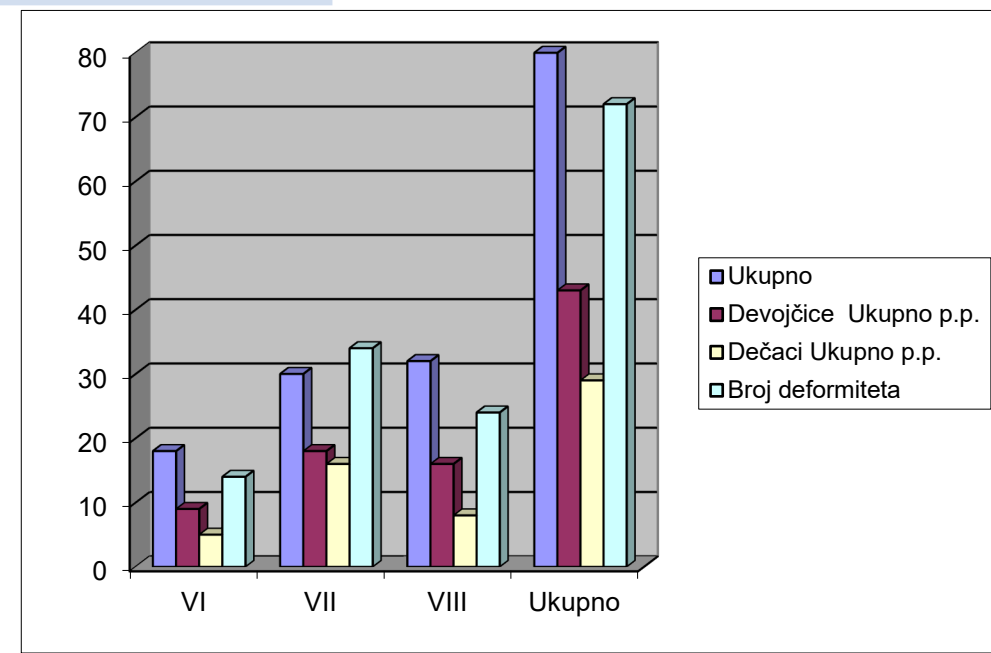
- 53,7% (F) ;

- 30,8% (M)



grade	Average body height(mm)	Average body weight (kg)	Total number PK	Total number PL
VI	1516,4	44,4	6	8
VII	1524,7	45,4	20	14
VIII	1615,6	52,9	13	11

Table 5:
- in students of VI and VII grade with an increase in body height and weight increases the presence of deformities,
- a smaller number of postural disorders is present in VIII grade students



RESULTS WITH DISCUSSION

- The results of the research show that 41.3% of the total number of subjects have postural disorders of the spine in the sagittal plane.
- The presence of postural disorders of the spine is higher in female students and amounts to 53.7%, while in male students it amounts to 30.8%.
- Students of VI and VII grade with greater body height and body weight had more postural changes in the position of the spine in the thoracic and lumbar part. The number of postural disorders in the sagittal plane is lower in VIII grade students
- The spinal column in the sagittal plane shows normal physiological curves in the value of 20 to 35 degrees with the apex of the curve at the level of the VII thoracic vertebra. Physiological vertebral wedging can be tolerated up to 5 degrees.

RESULTS WITH DISCUSSION

- It is assumed that the sacroiliac joint of the pelvis determines the movement with the reaction of the rest of the spine, thus determining the position of the sacral bone and pelvis in a standing position based on the inclination.
- If the angle is increased - compensatory reaction CV - increased lumbar lordosis, which leads to an increase in dorsal kyphosis and cervical lordosis.
- In the early adolescent period, there are turbulent anatomical, physiological and hormonal changes that affect the intensive growth and development of the organism, and the bones grow faster than the muscles, which in turn tighten and increase the tone of the musculature of the whole body.

CONCLUSION

- Based on the obtained results, it was determined that the percentage of children with proper posture is higher than the percentage of children with postural disorders of the spine.
- Bad habits of improper posture, lead to shortening and weakening of muscles and muscle imbalance, which is the main cause for the appearance and development of poor posture, in body deformities and postural disorders.
- The pattern of good posture contributes to the proper growth and development of children with a positive reflection on health and culture of living.