

AGE AND SEXUAL DIFFERENCES IN SOMATIC AND FUNCTIONAL CHARACTERS IN 11 TO 12 YEARS OLD YOUTH OF TUNISIA

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One of the main tasks in the fight against the economic and cultural backwardness of developing countries is the care and attention given to education, upbringing and health of the young generation. The realization of the whole complex of measures in the field of the care of youth requires, in the first place, to gather information about the somatic and functional development of the youth of the country concerned. Within the framework of the international assistance to developing countries the Research Institute of Physical Culture in Prague has been cooperating for some time in the preparation and realization of a research project concerning the physical condition and performance of Tunisia's youth.

In the first stage of the investigation the authors examined 294 children at the age of 11 to 12 years. This number of children represent a sample (10 %) of the pupils of the first grade of secondary schools in the capital city. The complex investigation covered: all anthropometric characteristics according to the International Biological Programme, strength of seven functional muscle groups, latent period of the contraction and relaxation of the muscles, utilization of the functional capacity of the muscle in quick contraction, indices of the development of respiratory function, adaptation of the circulatory system to the work-load during step-test, and motion performance. There was also carried out an analysis of the differences in the level and equality of the develop-

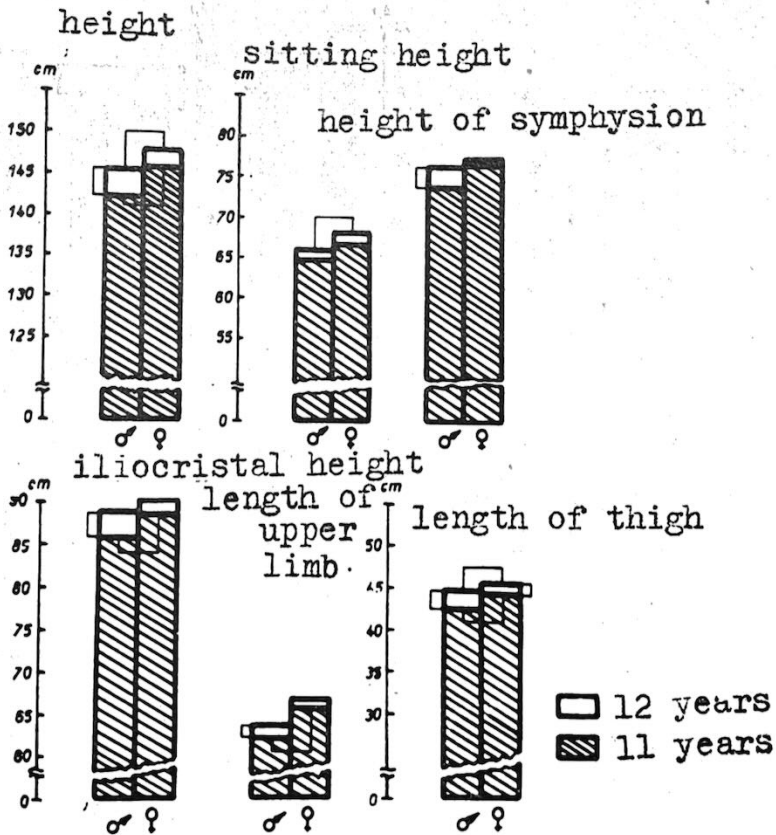
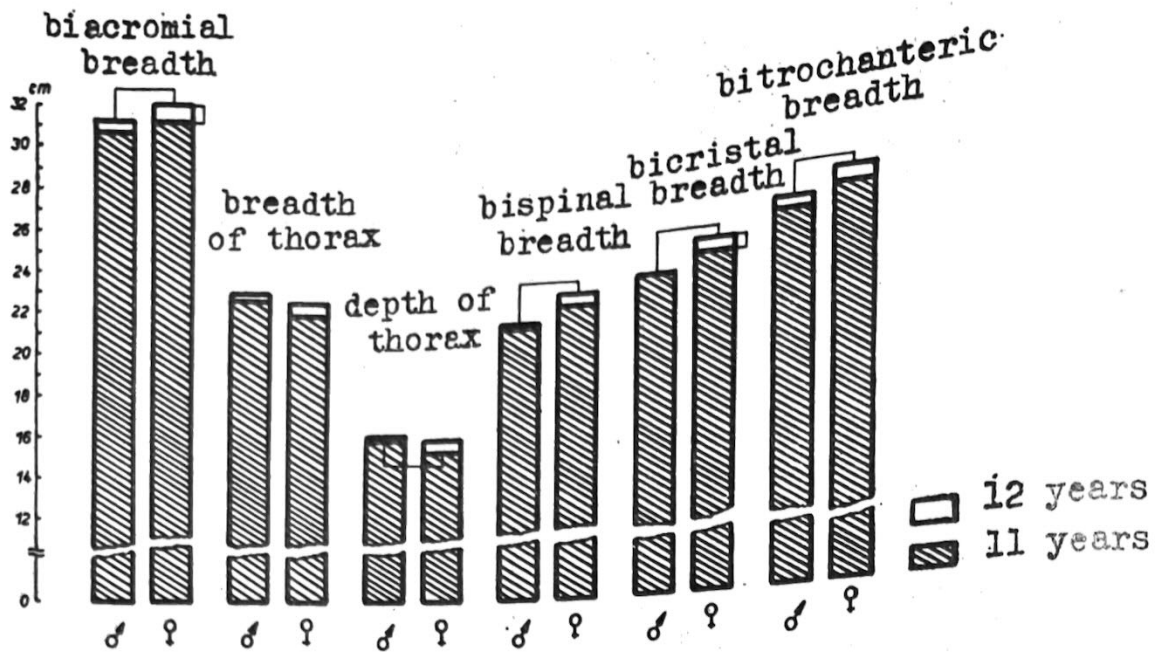


FIG. 1

Height values of 11 to 12-year old boys and girls in Tunisia.

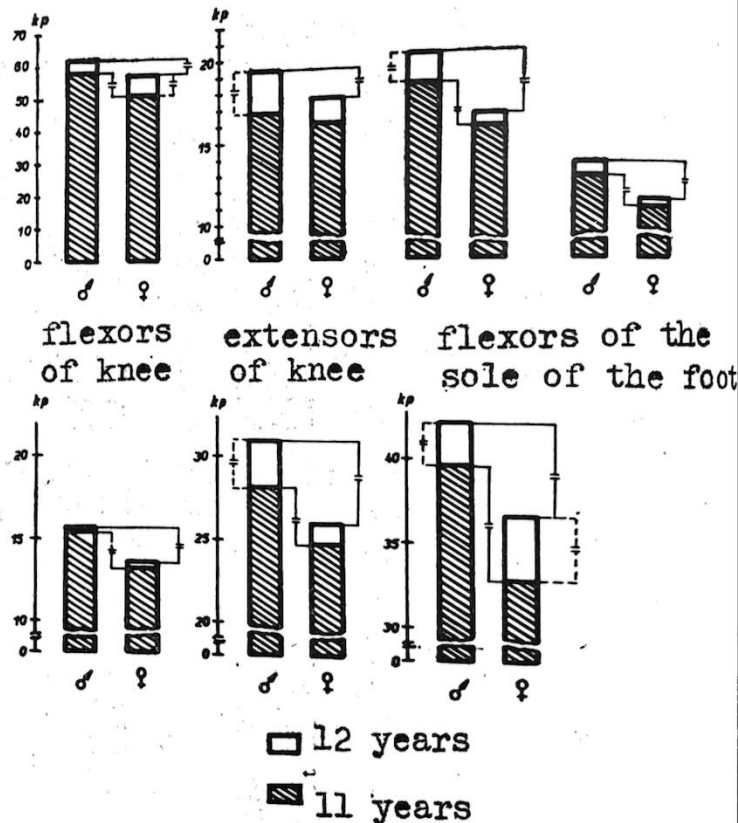
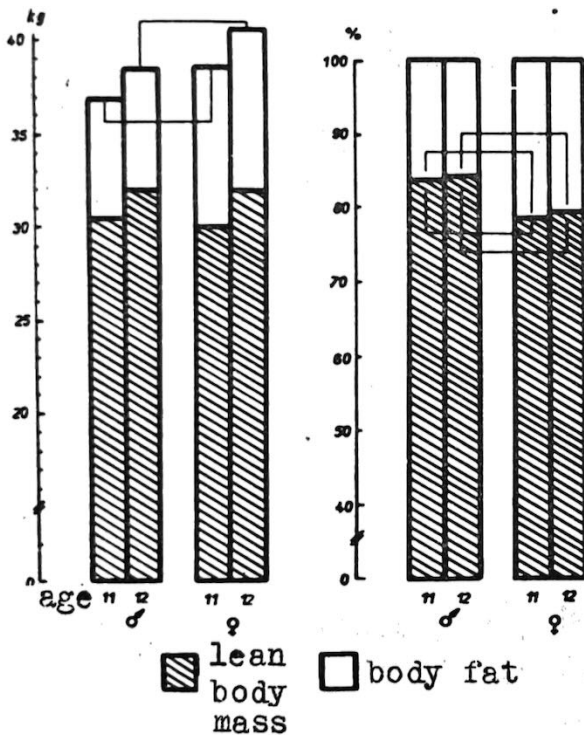


ment of the individual indices within groups of children that differed both in age and sex.

ANALYSIS OF THE MATERIAL

In evaluating age differences we find in both sexes only a slight number of the same differences between

individuals of 11 and 12 years of age. In the older age group the differences in somatometric characteristics include higher values of the length of lower limbs, the functional indices include absolute strength of the plantar flexors, vital capacity of lungs and forced expiration. With the boys we find much more age differences than with the girls.



Weights and body composition (absolute and relative) of 11 to 12-year of boys and girls in Tunisia.

Absolute muscle strength.

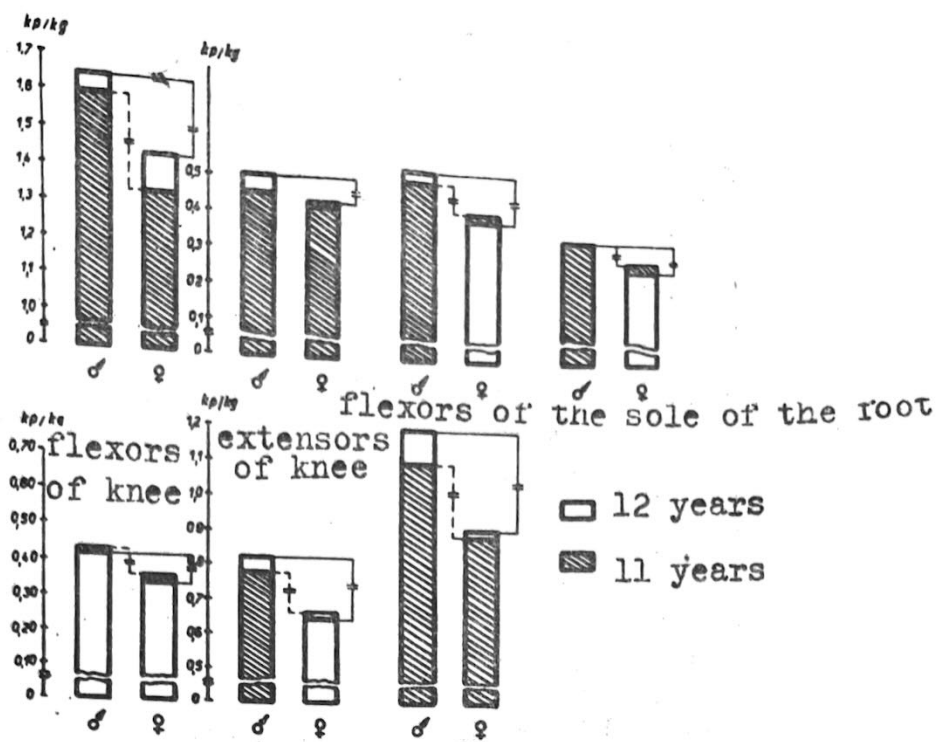


FIG. 5
Relative muscle strength.

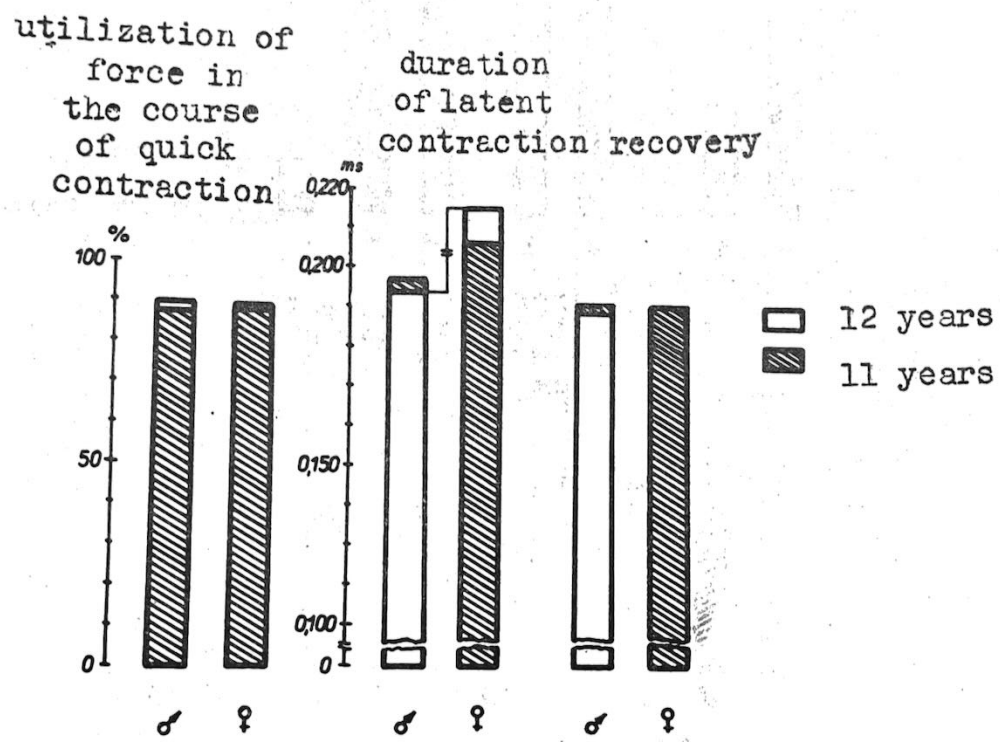


FIG. 6
Speed abilities.

Boys of 12 years of age surpass the younger sample in height characteristics (body height, height of suprasternale, symphision, iliocristale, tibiale) and also in length characteristics (length of thigh, upper arm, arm and thigh). With the girls the differences exist only in the height of tibiale and length of thigh.

In examining the sexual differences we find that the girls are taller and have longer arms and thighs. In the eleven-year group there were also found higher

values of the height of iliocristale and longer upper extremities.

In breadth measures age differences in girls appear only in biacromial and bicristal diameter. The sexual difference is accentuated especially at the age of 12 by higher values of the breadth measures in the pelvic region of girls (bispinal, bitrochanteric and bicristal breadth) who, however, also show higher values of biacromial breadth.

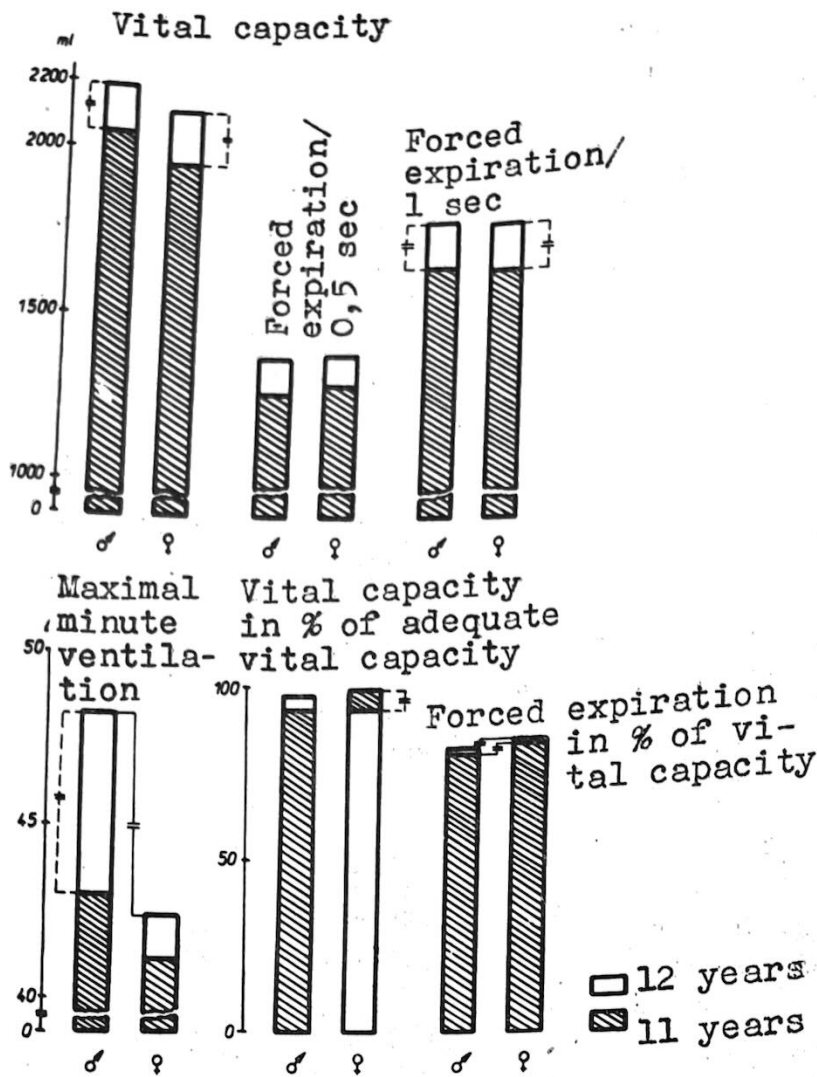


FIG. 7
Respiratory functions.

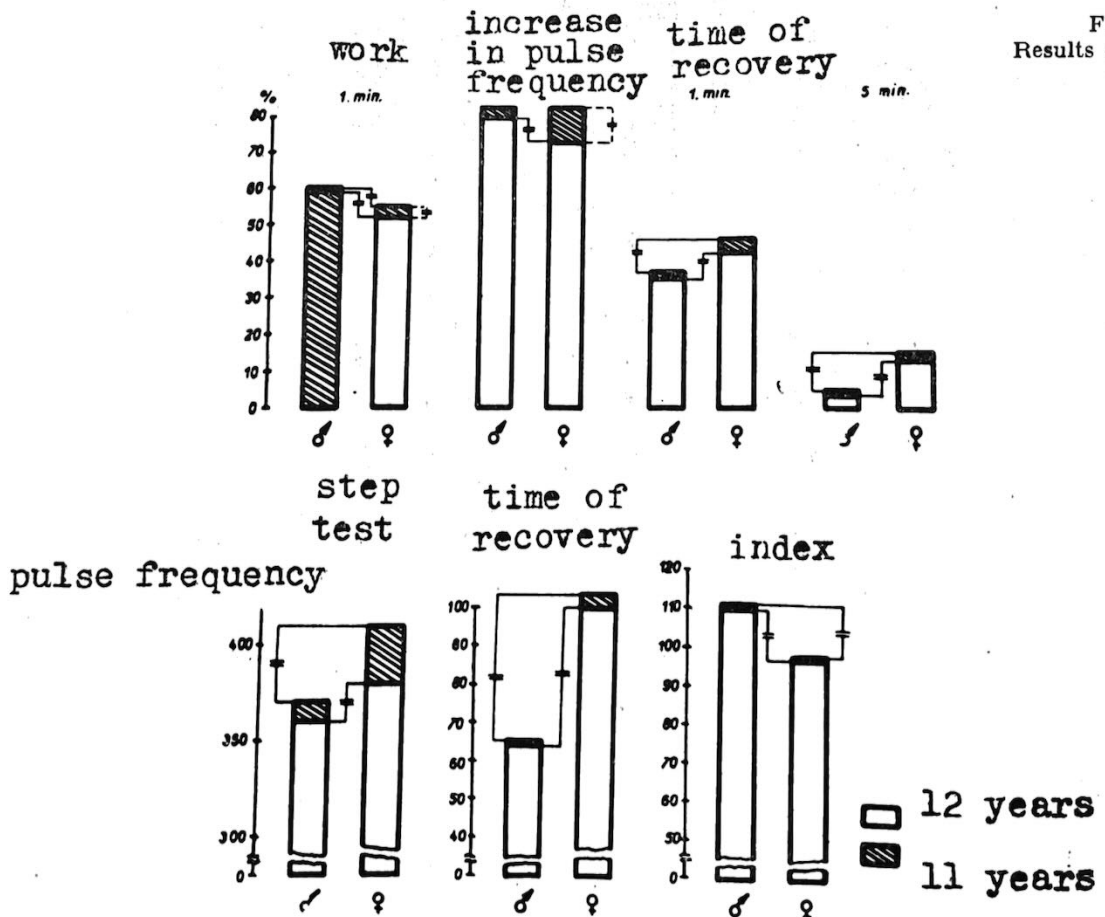


FIG. 8
Results of step test.

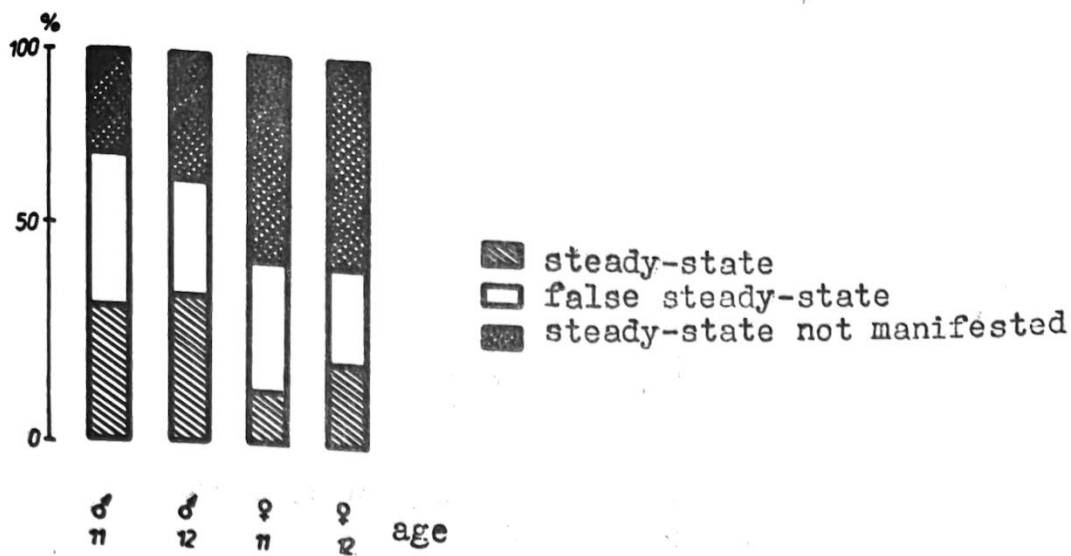


FIG. 9
The percentage of children in the groups according to the character of the curve of pulse frequency.

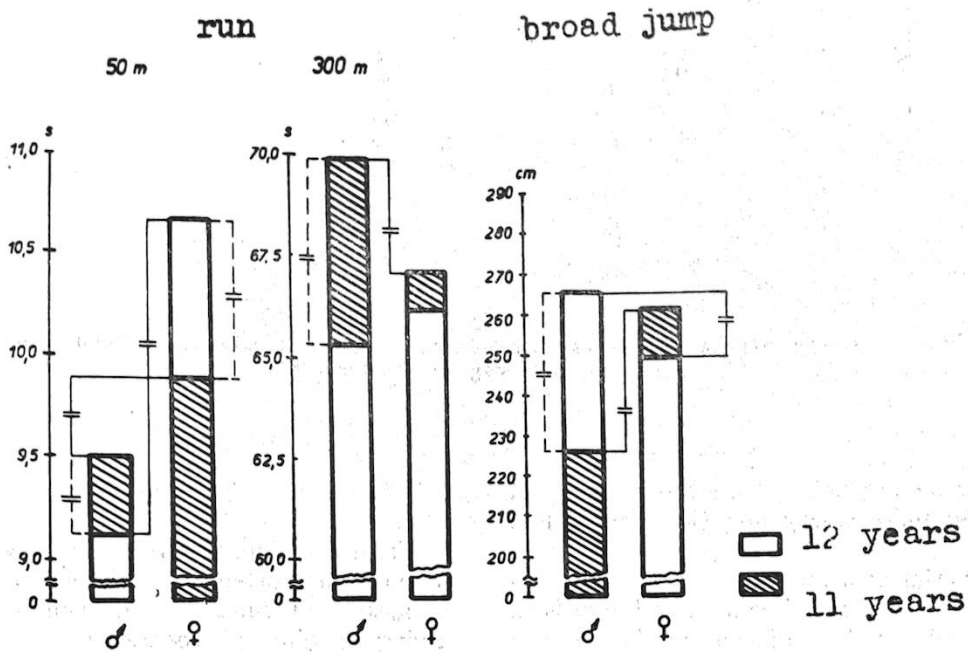


FIG. 10
Motion performance.

Both in boys and in girls we did not find any significant age differences in the weight and body composition indices. Similar results were obtained in comparing the proportion indices. Sexual differences are very striking; in both age groups the girls are heavier, they have higher amounts of body fat, while the boys show higher values of lean body mass.

One of the important characteristics informing about the motor development is the muscle strength. Therefore, the examination also included dynamometric measurements. The results have shown that more exact picture about the muscle strength of the children was given by relative values, that is values calculated per one kilogram of body weight. In absolute values we registered both age and sexual

differences. In relative values of strength there appeared only sexual differences — in favour of boys — in all functional muscle groups.

In the characteristics informing about speed ability there were found no significant age and sexual differences. Only in 12-year old girls there was observed some decrease in the value of the latent period of contraction.

As regards the respiratory function there appeared age differences in absolute values. The only sexual difference lies in a better utilization of the capacity of lungs by girls.

The boys are characterized by better adaptation of the circulatory system to the work-load. Most of the boys performed the work during step-test in true or false steady — state, while in the majority

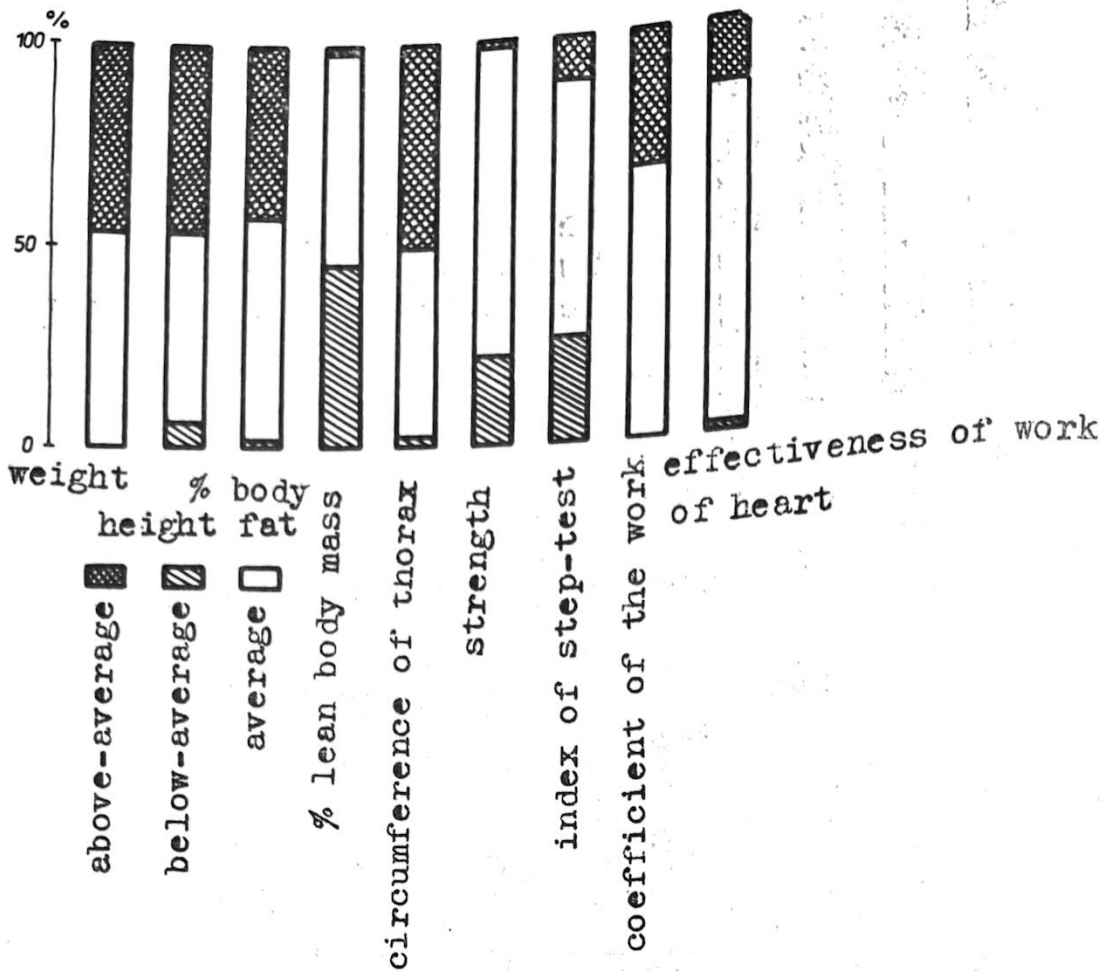


FIG. 11
Values of below-average, above-average and average morphological development and functional indices in children in the third and higher stage of sexual maturity.

of girls this state did not appear. The recovery of girls proceeded more slowly and the index values were lower.

In motion performance we observe age differences in boys, who at the same time surpass the girls in speed and speedstrength performance. At this age it is not yet possible to observe significant endurance differences between boys and girls. In girls of 12 years of age we observed a decrease in speed, which is manifested in performances in 50 m run and in broad jump.

The process of sexual maturity appears earlier in girls than in boys. In 28 % of girls and 6 % of boys at the age of 12 we found the third or higher degree of the development of secondary sexual characteristics. In many cases these children showed marked deviations from the average development values of the respective sample. A great number of them showed above-average values of weight, height, amount of body fat, and thorax circumference, but at the same time the values of lean body mass were below the average. In their motion abilities there children were for the most part characterized by average values.

CONCLUSIONS

From the comparative analysis it is evident that despite the existence of differences in the level of somatic and functional development of children living in different socio-economic conditions, the age and sexual differences at his age are very similar to those found in children of industrially developed countries. Girls are for the most part somatically more developed than boys, but boys are characterized by better functional abilities. Both in boys and in girls there appear considerable individual deviations from the mean values, which are closely linked up with the level of sexual maturity of the child concerned.

The results have shown that in evaluating the physical condition and performance it is necessary to assess at the same time somatic and functional characteristics. The explanation is that high level of somatic parameters does not mean higher physical fitness. This phenomenon could be observed in girls, who were somatically more developed than boys but showed worse results in the indices of body composition, muscle strength, adaptation of the circulatory system to strain, motion performance, and some other factors.

SUMMARY

A comparison of age and sexual differences in boys and girls in Tunisia shows that despite significant differences in somatic and functional development of children living in different socio-economic conditions age and sexual differences were similar to those found in children living in developed industrial countries. The level of somatic development was higher with girls than with boys of the same age. The boys, on the other hand, are characterized by better functional abilities. These functional abilities included

not only muscle strength, but also better performance of the cardiovascular and respiratory systems, and also performance in certain sport disciplines, such as 50 m and 400 m run, broad jump, and throw with cricket ball. There were also found some significant individual deviations from the mean values, which are the result of the different level of sexual development of the individual children.

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