

Thesis of dissertation for candidate degree

MORPHOFUNCTIONAL STATUS OF LITHUANIAN CHILDREN
(age dynamics, factor pattern, secular trend from the
material of investigation of Vilnius children)

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This candidate thesis deals with the problems of growth, development and secular trend of Lithuanian children and youth (from 2 till 18 years old) gives a complex analysis of morphological, functional traits, sexual development, physical activity and morbidity.

Data presented in this thesis based on a growth study carried out in Vilnius secondary schools and kinder gardens. The sample consists of 3792 children 2 to 18 years age. Standard anthropometric and physiometric methods (MARTIN and SALLER, 1957) were used. Data were computed using linear and multiple analyses (statistical packages BMDP).

The results of this study allowed to make such conclusions:

1. Morphological status of Lithuanian children is follow:

— pubertal growth spurt of body height and the other longitudinal measurements occurs at the age between 13 and 16 years in boys and between 11 and 14 in girls. During the age period between 2 and 18 years body the height of boys increases from 89.2 to 179.6 cm, the girls one — from 87.8 to 165.6 cm.

— peak height velocity (PHV) of body mass is common at the age between 14 and 16 in boys (it coincides with the growth spurt of lean body mass — LBM) and between 12 and 13 y. in girls (coincides with PHV of LBM and body fat — BF). From 2 to 18 y. of age body mass increases from 13.1 to 70.7 kg in boys and from 12.3 to 60.0 kg in girls. Absolute amount of LBM in boys during the period from 7 to 18 y. grows from 20.5 to 58.0 kg, in girls — from 19.4 to 43.

— sexual dimorphism of body composition is distinct since the middle of adolescence period: from 7 to 12 y. of age BF% in boys varies from 18.9 to 21%, in girls — from 19.4 to 20.9%. Later the rapid increment of LBM% occurs in boys (BF% decreases to 16.8% at the age 18), while in girls BF% grows until the age of 18 and achieves 28.7%.

— cluster analysis showed the different influence of various skinfolds on body fat through all 7—18 year-old period: BF% has the high correlation with all skinfolds in both sexes till the middle of adolescence, while later BF% in boys depends mostly on skinfolds of trunk and in girls — of limbs and abdomen.

— big body mass not always coincides with high BF% (especially in boys). Till the middle of pubertal period obesity occurs more often in tall children, while later it is more common in little children. It must be stressed, that small in height and

mass boys and girls have usually high LBM%. Therefore height and mass can't reflect the functional possibilities of organism.

— the main indices of proportions of the body are normal.

2. Functional characteristics can be summed up as follows:

— PHV of blood pressure, vital capacity, hand grip occurs as usually at the moment of the growth spurt of the main morphological indices. During the period between 7 and 18 y. blood pressure increases from 101.0/59.4 to 127.6/79.8 mmHg in boys and from 97.8/57.8 to 126.8/81.6 mmHg in girls. Vital capacity increases from 1391.0 to 4338.0 ml and from 1207.0 to 3096.0 ml, hand grip of right hand — from 10.3 to 46.5 kg and from 8.0 to 27.6 kg respectively.

— relative indices of strength and vital capacity change with the age differently than the absolute amounts and are connected with the body composition more closely. These indices in boys are higher than in girls and shows bigger functional possibilities of mail organism more expressively than absolute amounts.

— PHV of sexual maturation in boys occurs between 15 and 16 y. of age ($Po = 14.80$ y.), in girls — between 13 and 14 y. ($Me = 13.37$ y.). The earliest second sexual trait in boys is Pubes (12.5 y.), the latest one — Barba (> 18 y.). First of all in girls hip become wider (9.0 y.), then occurs Pubes (11.12 y.), Mammae (11.49 y.) and Axillares (12.19 y.), hip widen not finished at the age of 18. Big in height and mass children have more higher degree of maturation than small ones. Sexual dimorphism is especially distinct in body composition and in functional characteristics.

3. Factor analysis of morphofunctional development including morphological indices, body composition, sexual maturation, physical activity and morbidity reveals that factor pattern depends on age and sex and shows the hierarchy of various indices:

— there are no sex differences in factor pattern of physical development until adolescence begins (at 12 y. of age in girls and 13 y. in boys). The first factor describes fatness (body fat, girths, some transverse indices). the second factor influences body size (the principal factor loadings fall on LBM, height, the other length measurements, biacromial and bicristal diameters).

— from the beginning of adolescence growth spurt sexual dimorphism of factor model is distinct: the first factor in girls describes body fat while in boys it influences body size.

— with some exceptions, separate and not connected factors influence morphological, functional characteristics and morbidity.

4. Secular trend in Lithuanian children between 1965 and 1985. has positive and negative affect on various morphofunctional indices:

— it was revealed the positive tendency of height with maximal values in the middle of adolescence, it is especially expressed in boys. As it concerns body mass and chest circumference, it should be mentioned only increment of absolute values in boys, while these indices in modern girls (compare to height) are less.

— gracilization and leptosomization of head and the upper part of the body in modern children is evident, while bicristal diameter during two past decades increased proportionally to body height. This process is more expressed in girls.

— the all functional characteristics have negative tendency since 1965. Therefore negative changes were found in growth and development of Lithuanian children during past two decades. The most striking factor is bad ecological situation in Lithuania. It must be stressed also such negative factors as decreasing physical activity, wrong nutrition, sharp socio-economic changes.