

MORPHOFUNCTIONAL STATUS OF LITHUANIAN CHILDREN AGE DYNAMICS, FACTOR PATTERN, SECULAR TREND IN VILNIUS CHILDREN

(A Summary)

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This candidate thesis deals with the problems of growth, development and secular trend of Lithuanian children and youth, gives a complex analysis of morphological, functional traits, sexual development, physical activity and morbidity. Data presented are based on a growth study carried out in Vilnius secondary schools and kindergartens. The sample consists of 3792 children 2 to 18 years of age. Standard anthropometric and physiometric methods (Martin & 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 as follows:*

Pubertal growth spurt (PGS) 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 the body height in boys increases from 89.2 to 179.6 cm, in girls from 87.8 to 165.6 cm.

Peak weight velocity (PWV) seems to be at the age between 14 and 16 years in boys (it coincides with the growth spurt of lean body mass – LBM) and between 12 and 13 years in girls (coincides with PGS of LBM and body fat – BF). From 2 to 18 years of age body mass increases from 13.1 to 70.7 kg in boys and from 12.3 to 60.0 kg in girls. During the period from 7 to 18 years absolute amount of LBM in boys grows from 20.5 to 58.0 kg, and in girls from 19.4 to 43.0 kg.

Sexual dimorphism of body composition is distinct since the middle of adolescence period. From 7 to 12 years 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 different influences of various skinfolds on body fat through all the 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 did not always coincide with high BF%, especially in boys. Till the middle of pubertal period obesity occurred more often in tall children, while later it is more common in little children. It must be stressed, that boys and girls small in height and mass 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:*

PGS 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 years blood pressure increased 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 increased from 1391.0 to 4338.0 ml, and from 1207.0 to 3096.0 ml, resp.; Hand grip of right hand changed from 10.3 to 46.5 kg, and from 8.0 to 27.6 kg, respectively.

Relative indices of strength and vital capacity changed with age differently (compared to the absolute amounts) and were connected with the body composition more closely. These indices in boys were higher than in girls and showed greater functional possibilities of male organism, more expressively than absolute amounts.

PGS of sexual maturation in boys occurs between 15 and 16 year of age (Pollutio = 14.80 year) and in girls between 13 and 14 year (Menarche = 13.37 year). The earliest second sexual trait in boys is Pubes (12.5 y.), the latest one Barba (> 18 y.). In girls, first of all hip becomes wider (9.0 y.), then occurs Pubes (11.12 y.), Mamma (11.49 y.) and Axillary hair (12.19 y.); hip widen not finishes at the age of 18. Children great in height and mass 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 beginning of adolescence (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 recent girls (compared to height) are less.

Gracilization and leptosomization of head and the upper part of the body in recent children is evident, while bi-iliocristal diameter during the two past decades increased proportionally to body height. This process is more expressed in girls.

All the functional characteristics have negative tendency since 1965. Therefore negative changes were found in growth and development of Lithuanian children during

the last two decades. The most striking factor is the bad ecological situation in Lithuania. It must be stressed also such negative factors as decreasing physical activity, wrong nutrition, sharp socio-economic changes.

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