

## SECULAR PATTERNS OF GROWTH PROCESSES IN MODERN MOSCOW INFANTS COMPARED TO THE INFANTS OF THE 1970'S

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The dynamics of the body dimensions (body length and mass, chest circumference) of Moscow infants of 2000's from birth to 12 months compared to that of infants of 1970's is observed. Modern data were collected by the authors on the basis of child outpatient clinics from medical cards, following ethic norms. A longitudinal sample of about 500 children was formed, including monthly dynamics of physical development indices accompanied by the full medical background. Archive data of 1970's was collected in the course of a cross-sectional anthropometric study. The comparison of dynamic curves, preliminary standardized, of body length of boys and girls describes the process of secular increase of modern infants length, more expressed in the second half of the first year of life and increasing towards the age of 12 months. The level of differences is 0.4–1.0 and 0.4–1.4 SD for boys and girls correspondingly. The comparison of dynamic curves of body mass and chest circumference describes the opposite tendency of some decrease of the dimensions of modern children from birth to 6 months from the level of 0.6 SD to zero. Secular increase of length combined with the decrease of mass and chest circumference means that the process of leptosomes of body build in modern infants is growing as compared to the second part of the 20th century. The absence of the distinct secular differences of the length growth curves through the first 6 months of a child's life is connected with the intensive compensatory growth, which smooths the limitations of the prenatal growth in search of the stable growth curve.

**Key words:** *physical development indices, growth curves, infants, secular trends*

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## CONFIRMATION REGARDING SIMILARITY AND DISSIMILARITY TO PHYSICAL GROWTH CURVE OF TWINS BY CROSS-CORRELATION FUNCTION

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Scientific verification is impossible without quantitative assessment of the similarity or dissimilarity to the curve of growth pattern of twins. In this study, this assessment was verified by applying a cross-correlation function in analysing changes from collapsing one of the curves to examine their similarity. The minimum growth curve must be functionalized to apply a cross-correlation function. Thus it is important to approximate the growth curve by the Wavelet Interpolation Method (WIM) proposed by Fujii (1999). Cross correlation function can then be applied to the quantified curve by WIM. Longitudinal growth data consisting of height, weight, sitting height, and leg length was obtained for a pair of identical and a pair of fraternal twins from age six (first year of elementary school) to age 17 (third year of high school). As a result, changes in the cross-correlation coefficient were found by applying the cross-correlation function to identical and fraternal twin height growth described by WIM and collapsing one (set of) growth distance values and velocity values. With  $r = 0.93$  for identical twins and  $r = 0.74$  for fraternal twins, similarity in identical twins was found to be very high when examining changes in correlation coefficients. Similarity among identical twins was also found to be high when weight, sitting height and leg length were analysed, with high correlation coefficients in all three.

**Key words:** *cross-correlation function, wavelet interpolation method, twins, similarity, dissimilarity*

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