

# INFLUENCE OF SEXUAL AND PHYSICAL DEVELOPMENT ON STRUCTURAL-FUNCTIONAL STATE OF BONE TISSUE [...]

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**INFLUENCE OF SEXUAL AND PHYSICAL DEVELOPMENT ON STRUCTURAL-FUNCTIONAL STATE OF BONE TISSUE IN PRE- AND PUBERTAL GIRLS**  
(WPŁYW ROZWOJU PŁCIEWEGO I FIZYCZNEGO DZIEWCZĄT W OKRESIE POKWITANIOWYM I PRZEDPOKWITANIOWYM NA FUNKCJĘ I STRUKTURĘ TKANKI KOSTNEJ)

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To study influence of sexual and physical development on structural-functional state of bone tissue (BT) we've examined 97 girls aged 10–16 years old (mean age – 13,2±0,18 years; height – 1,54±0,01 m; weight – 45,6±1,3 kg). Quantitative evaluation of sexual development parameters was carried out using Tumilovych's method. The following anthropometric parameters were determined: chest volume (CV, sm), pelvic size

(DSp – distance between anterior iliac spines, DCr – distance between sacral crests, DTr – distance between trochanters, sm). To evaluate structural-functional state of bone tissue (BT) ultrasound bone densitometer “Achilles+” was used (Lunar Corp., Madison, WI). Speed of ultrasound spreading (SOS, m/sec), broadband ultrasound attenuation (BUA, dB/MHz) and Stiffness Index (%) were determined. Patients were divided into three groups: I gr. – 39 girls of prepubertal age (mean age –  $11,7 \pm 0,22$  years; height –  $1,46 \pm 0,02$  m; weight –  $35,6 \pm 1,4$  kg); II gr. – 33 girls of prepubertal age with disorders of menstrual cycle (mean age –  $14,0 \pm 0,2$  years); III gr. – 25 girls with established menstrual cycle (mean age –  $14,4 \pm 0,2$  years). Appearance of menarche led to considerable increase in physical development parameters: (height: I gr. –  $1,46 \pm 0,02$  m; II gr. –  $1,59 \pm 0,01$  m ; III gr. –  $1,59 \pm 0,01$  m; weight: I gr. –  $35,6 \pm 1,4$  kg; II gr. –  $51,4 \pm 1,8$  kg; III gr. –  $53,6 \pm 1,7$  kg; CV: I gr. –  $69,7 \pm 1,1$  cm; II gr. –  $81,2 \pm 1,2$  cm; III gr. –  $80,5 \pm 0,9$  cm; DSp:  $19,8 \pm 0,3$  cm; II gr. –  $23,3 \pm 0,3$  cm ; III gr. –  $24,2 \pm 0,3$  cm; DCr:  $22,4 \pm 0,3$  cm; II gr. –  $25,6 \pm 0,2$  cm; III gr. –  $26,3 \pm 0,3$  cm; DTr:  $25,1 \pm 0,4$  cm; II gr. –  $29,0 \pm 0,3$  cm; III gr. –  $30,1 \pm 0,4$  cm), general number of permanent teeth (I gr. –  $23,6 \pm 0,7$ ; II gr. –  $27,5 \pm 0,2$ ; III gr. –  $27,1 \pm 0,3$ ) and ultrasound characteristics of structural-functional BT state (SOS: I gr. –  $1570 \pm 3$  m/sec; II gr. –  $1580 \pm 4$  m/sec; III gr. –  $1587 \pm 5$  m/sec; BUA: I gr. –  $98,2 \pm 1,3$  dB/MHz; II gr. –  $107,0 \pm 1,8$  dB/MHz; III gr. –  $112,1 \pm 2,5$  dB/MHz; IS: I gr. –  $85,3 \pm 1,1\%$ ; II gr. –  $93,8 \pm 1,8\%$ ; III gr. –  $99,0 \pm 2,5\%$ ). Unlike parameters of physical development, SI of girls belonging to III gr. has shown veritable increase compared to II gr. ( $p < 0,05$ ). Girls having pathological establishment of menstrual function and late menarche make up a risk group for osteoporosis. They need constant densitometrical control (once or twice a year) and respective treatment and prophylaxis (Calcium, Vitamin D metabolites, exercise therapy etc.).