

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 ± 3 m/sec; II gr. – 1580 ± 4 m/sec; III gr. – 1587 ± 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.).