B-4 Bone Composition and Bone Mineral Density in Alite Athlite

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We investigated in bone mineral density (BMD) and %fat on aerobics exercise instructor (AERO), gymnastic competitor (GYM) and swimmer (SWIM). BMD and %fat were measured with Dual Energy X-ray absorptiometry (DEXA). Low BMD and %fat in some of groups were found. It was suggested that diet or lifestyle and so on had cause.

B-5 Body composition from bioelectrical impedance detected between the sole of feet in the standing position

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This study aimed to assess the body composition from bioelectrical impedance (Z) detected between the sole of feet in the standing position. Z was measured by use of a portable four-terminal bio-impedance analyzer (Selco, SIF-891) with copper electrodes. The distance between the current-introducing electrode and the detector electrode was maintained at 60 mm in both feet. Z was significantly lower when samller electrodes with a diameter of 8.5 mm were used. No differences existed in Z obtained between three kinds of electrodes with a diameter greater than 23.5 mm and less than 53.5 mm. Correlations between three kinds of Z values were 0.991 and greater. The effect of contact pressure (5-100 kg) on Z was negligible. The distance between the soles of feet (14-54 cm) had no effect on Z. Z (445.4±6.9 ohms) measured under the following conditions were significantly correlated (r=0.935) with standard Z (495.2±90.5 ohms) in healthy adult men and women (n=87): 1) diameter of the electrode = 23.5 mm, 2) the sole distance = 34 cm, 3) the sole of feet is wiped with a wet duster, and 4) the upper legs do not contact each other. However, the mean difference of approximately 50 ohms was significant, so that we propose to use y = 1.21x - 36.9, where y = standard Z and x = Z measured by the sole method in the standing position. Cross-validity of this equation was high in boys (r=0.938, n=19), girls (r=0.968, n=15), and adult women (r=0.857, n=30). Consequently, we suggest that the convenient method proposed in this study can be applicable to the simultaneous asessment of body weight and body composition or prior to bathing.

B-6 Effect on body composition of a low-energy, low-protein diet

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The purpose of this study was to examine the short-term effect of a low-energy, low-protein, vegan diet on the body composition of middle-aged women. The vegan diet contained 120 g of brown rice, 420 g of five varieties of leafy green vegetables, 490 g of three kinds of roots, 80 g of fruits, and 10 g of salt daily. Body fat was measured in 11 women aged 52 ± 3 yr (mean ± SE) by bioelectrical impedance. Their mean energy and protein intakes were 16.2 ± 1.1 kcal/kg and 0.57 ± 0.05 g/kg, respectively. Base-line body weight, % fat, fat mass, and fat-free mass (FFM) were 47.9 ±1.3 kg, 23.1 ± 1.8%, 11.1 ± 1.0 kg, and 36.8 ± 1.2 kg. After 6 weeks, the decreases in body weight by 4.4 ± 0.6 kg, % fat by 6.4 ± 1.4%, and fat mass by 3.9 ± 0.7 kg were significant. The decrease in FFM was not significant (0.5 ± 0.5 kg). Of the total weight loss, 89.6% was loss of fat mass and 11.4% was loss of FFM. The daily loss of energy from fat mass was 674 ±126 kcal, and the daily loss of energy from FFM was 10 ± 11 kcal. The daily energy loss from the body was 15.7 ± 2.7 kcal/kg, which was close to the energy intake. Subjects used energy from body weight loss for basal metabolism and physical activity. There was no excess loss of FFM in middle-aged women on a low-energy, low-protein, vegan diet for 6 weeks.

B-7 The Effect of Body Composition on Physical Fitness and Motor Ability in Junior High School Boys and Girls

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The purpose of this study was to clarify the relationship of body composition with five motor ability elements and six physical fitness elements including maximal oxygen uptake (V̇o2max, ml/kg/min) in junior high school students. The subjects were 144 boys and girls, aged 12-15 years. Body composition was measured by bioelectrical impedance method. The subjects were categorized into three groups according to their percentage of body fat (%fat): lean (fat < 12 %), obese (fat ≧ 20 %), and intermediate (12 ≦ fat < 20 %) for boys, and lean (at < 15 %), obese (fat ≧ 25%), and intermediate (15 ≦ fat < 25 %) for girls. Results were as follows. 1) Physical fitness test: In boys the obese group was significantly inferior in side step and vertical jump to the other two groups, while in girls no significant differences existed between three groups. 2) Motor ability test: In boys the obese group was significantly inferior in chin-ups and 1500-m run to the other groups. In girls, the obese group was significantly inferior in 50-m run, running long jump and chin-ups to the other groups. 3) V̇o2max values of the obese group in both sexes were significantly lower than those of the other groups. No significant group differences existed for V̇o2max per LBM (ml/kg/min).

B-8 Effect of Low Ca Diet and Exercise on Bone Mineral Density.

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This study examined the effect of low Ca diet and exercise on bone mineral density by Dual Energy X-ray Absorptiometry (DPXL). Eighteen male rats at 30-weeks of age were divided into four groups: normal diet-control (NC ; N=5), normal diet-exercise (NE ; N=4), low Ca diet-control (LC ; N=5) and low Ca diet-exercise. Exercise consisted of running on a flat-bed treadmill, 20m/min., 1hr/day and 5days/week for 15 weeks.

The results of our study were summarized as follows:

1) Bone mineral density (BMD) of femur was significantly higher in NC and NE than that in LC and LE groups.
2) No difference in BMD of femur was found between non-exercise and exercise groups.

These results suggest that low Ca diet has a negative influence and exercise has no affect on BMD in this study.

B-9 Aging Changes in Body Volume and its Estimation for Japanese Males and Females, Aged 10 to 60

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The purpose of the present study is to determine human body volume(Hydrostatics=Under-water weighing;(weight−weight in under-water)/(density of water)−residual lung volume,)according to aging,and estimate it from anthropometric measurements on 1345 Japanese males and females,aged 10 to 60. Mean values of body volume on males(females) were 34.6 L(35.0) in 11.0 -year -olds, 60.1 L(50.1) in 20.0-22.4, 61.2 L(52.2) in 40-44.9 and 64.5 L(51.7) in 55.0-59.9 . Multiple regression equations for predicting body volume(BV) : All Subjects ; BV(Male)=-0.07567H+1.01053W+0.00117A+8.59574[MR=0.9989,CD=0.998,SEE=0.607], BV(Female)=-0.05686H + 1.03190W+0.00319A+5.16879[MR=0.9984,CD=0.997,SEE=0.477]. Senior heigh school students and those olders ;BV(Male)=-0.05682H+1.01146W+0.00669A+5.15809 [MR=0.9979, CD=0.996,SEE=0.659], BV(Female)=-0.04975H+1.03387W+0.00638A+3.84225 [MR=0.9973, CD=0.995,SEE=0.485]. [H; Height, W; Weight, A; Age]