was assessed through use of previously validated, generalized equations. The age-related decline in $\dot{V}O_2max$ ($ml \cdot kg^{-1} \cdot min^{-1}$) was 38% and 43% for men and women, respectively. The corresponding decrease in LBM was 9.0% and 8.3% yielding reductions in $\dot{V}O_2max$ expressed per kg LBM of 32% and 37%. Our results suggest that the decrease in LBM can only account for approximately 15% of the decline in $\dot{V}O_2max$ which accompany advancing age. Thus, the bulk of the decrement in aerobic power with age is likely to be more casually related to decreases in circulatory, metabolic, and pulmonary functions.

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#9

GENERALIZED BODY COMPOSITION PREDICTION EQUATION FOR MEN USING SIMPLE MEASUREMENT TECHNIQUES

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143 men ranging in age from 22 to 81 years and percent body fat of 3.7 to 40.1 were selected to establish a generalized body composition prediction equation using simple measurement techniques. Subject selection was based on a central composite rotatable design. The measurements consisted of height (HT), weight (WT), age and 10 circumferences. The above measurements were analyzed using stepwise multiple regression techniques and the following equation was derived: LBW = 17.298 + .89946 (Wt in kg) −.2783 (age) + .002617 $(age)^2$ + 17.819 (ht in m.) −.6798 (Ab − Wr in cm) (R = .924, SEE = 3.27) where LBW = lean body WT, Ab = abdominal circumference at the umbilicus and level with the iliac crest, Wr = wrist circumference distal to the styloid processes. A second group of 109 men (23-74 years, 0-47.5% fat) was used to test the validity of this equation and similar equations derived by Hodgdon & Beckett (HB), Wright & Wilmore (WW), Wilmore & Behnke (WB), and McArdle et al (MC). A paired t-test on the mean difference ($\bar{D}$) between actual and pridicted percent fat showed that the present equation had a mean difference of 0.6% ± 0.45 which was not statistically different from zero ($p<.05$). The mean difference between actual and predicted percent fat for the other equations were all greater than zero ($\bar{D}HB$ = 2.7% ± .44, $\bar{D}WW$ = 2.5% ± .48, $\bar{D}WB$ = 1.7% ± .42, $\bar{D}MC$ = 6.0% ± .46). The percent fat predicted by the present equation was also significantly different from that predicted by the other equations ($p<.05$). These results show that the present equation is a more valid predictor of LBW over a wide range of body composition and age than the other equations tested. The power of this equation can probably be attributed to the central composite rotatable design sampling technique used to gather the data.

#10

DIFFERENCES IN PREDICTED AND MEASURED RESTING ENERGY EXPENDITURE IN MODERATELY OBESE MALES -- PREDICTING VELOCITY OF WEIGHT LOSS.

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The Harris-Benedict equation (HBE) is widely used to estimate resting daily caloric (kcal) expenditure (RMR) in weight loss programs plus an adjustment for decreases in RMR from hypocaloric diet and decreases in thyroid and catecholamine production. However, the HBE was derived from healthy individuals with normal body weight and composition. Clinicians are aware of the difficulty experienced by obese individuals to sustain a predicted rate of weight loss, especially as they approach closer to their ideal body weight goal. To explain the discrepancy we compared the Predicted Resting Energy Expenditure (PREE) as is estimated by the HBE, and Actual Resting Energy Expenditure (AREE) as assessed by indirect calorimetry, in 31 moderately obese ($\bar{x}$ above ideal body weight = 44 ± 2.8%) male subjects ($\bar{x}$ age = 48 ± 1.5 yrs.; $\bar{x}$ weight = 107.3 ± 3.1 kg.; $\bar{x}$% fat = 34 ± 1.6). AREE (1,942 ± 54 kcal/day) was found to be significantly ($P < 0.01$) lower than PREE (2,108 ± 49 kcal/day), but significantly higher ($P < 0.01$) to PREE (1,636 ± 24 kcal/day) if ideal body weight was used in the HBE formula. Individual variation of the AREE and PREE ranged from 65 to 105%, and 95 to 155% of the expected normal population values respectively. A regression equation was developed for estimating AREE from PREE.

The findings suggest that if the reduced daily caloric needs observed ($\bar{x}$ = −165 ± 25 kcal/day) is added to the 10-20% (194-388 kcal/day; $\bar{x}$ = 291 ± 19) metabolic suppression occurring during dietary restriction, it might explain why many obese individuals experience difficulties in maintaining predicted rates of weight loss.

#11

BIOMECHANICAL GAIT ANALYSIS OF OBESE ADULT MALES

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Orthopaedic problems such as arthritis, and a spectrum of musculoskeletal disorders are closely related to the severity of obesity. The purpose of this study was to examine some kinematic parameters in the walking gait of twelve obese (OB) subjects ($\bar{x}$ weight = 129.4 ± 3.7 kg; $\bar{x}$% above ideal weight = 81 ± 2.4; $\bar{x}$ age = 39 ± 1.8 years) to nine normal (NO) male volunteers ($\bar{x}$ weight = 71.4 ± 1.6 kg; $\bar{x}$ age = 32 ± 2.8 years; $\bar{x}$% above ideal weight = 1 ± 1.0 kg).

Three dimensional computerized cinematography, recorded and analyzed a full gait cycle of each subject walking at a self-selected pace. The following variables were examined: speed, cadence, stride length, step length, step width and cycle time. Statistical analysis (two tailed t-tests) showed significant differences between the means of the OB and NO subjects for the following parameters: speed: OB = 1.09 ± 0.14 m/sec vs NO = 1.64 ± 0.3 m/sec ($p < 0.001$); cadence: OB = 102.8 ± 8.4 steps/min vs NO = 116.1 ± 13.2 steps/min ($p < 0.05$); stride length: OB = 1.25 ± 0.1 m vs NO = 1.66 ± 0.2 m ($p < 0.001$); step length: OB = 0.64 ± 0.07 m vs NO = 0.84 ± 0.1 m ($p < 0.001$); step width: OB = 0.16 ± 0.03 m vs NO = 0.08 ± 0.01 m ($p < 0.001$); and cycle time: OB = 1.2 ± 0.1 vs NO = 1.04 ± 0.1 secs ($p < 0.05$). These data illustrate that the gait pattern of OB and NO male adults do differ. In addition, these findings might suggest that orthopaedic problems observed in obese adults could be partly due to characteristics of their kinematic walking gait parameters.

#12

EFFECTS OF A DIET AND EXERCISE PROGRAM ON BLOOD LIPIDS, CARDIORESPIRATORY FUNCTION, AND BODY COMPOSITION IN OBESE WOMEN

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The purpose of this study was to determine the effect of a combination diet and exercise program on blood lipids, cardiorespiratory function, and body composition in markedly obese women. Ten pre-menopausal females, from a residential program for obese patients, volunteered as subjects. The program lasted 42 days and consisted of a hypocaloric diet (1150 kcal/day) in combination with approximately 5 hours a day of low-intensity (100-132 bpm) aerobic exercise. The program resulted in a significant ($p < 0.05$) mean decrease in body weight of 6.6 kg for the group. Mean (± S.D.) relative body fat significantly decreased from 41.5 ± 6.4% to 36.9 ± 6.2%. Interestingly, the decrease in relative body fat was solely accounted for by a significant decrease in fat weight, as lean body weight remained constant. Mean cardiorespiratory function, as evidenced by changes in maximal oxygen uptake, increased 28%. Total cholesterol (TC) significantly decreased from a mean (± S.D.) 203 ± 36 mg% to 172 ± 33 mg%. There was no significant change in high density lipoprotein cholesterol (HDL-C). However, the mean TC/HDL-C ratio significantly decreased from 4.8 and 4.3. It was concluded that a combination hypocaloric diet and low-intensity exercise program can favorably improve body composition, cardiorespiratory function, and blood lipids in markedly obese women.

#13

POTENTIATION OF THE EFFECTS OF EPINEPHRINE ON MUSCLE GLUCOSE METABOLISM BY ESTROGENIC COMPOUNDS.

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