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Weight History Association With Current Cardiorespiratory And Muscular Fitness

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High cardiorespiratory and muscular fitness are often associated with lower body fat mass. Age-associated increases in body mass might be attenuated by maintaining a higher level of fitness into middle-age.
PURPOSE: This study aimed to compare the cardiorespiratory and muscular fitness of individuals who have maintained body mass during adulthood to those who have had substantial increases and/or decreases in body mass in adulthood.
METHODS: Obese, overweight, and non-obese adults were recruited to participate. Long-term health and weight history was collected retrospectively on 79 individuals. Total body composition, maximal oxygen consumption, grip strength, and maximal isometric knee extension strength were measured. Participants were subsequently categorized based on short term and long-term weight loss history, cardiorespiratory fitness, and muscle function for further analysis.
RESULTS: Participants (31 Male, 45 female, aged 41.0 ± 12.3 years) were 29.2 ± 10.1% body fat having gained 9.3 ± 11.7 kg since 20 years of age. Current cardiorespiratory fitness as indicated by relative maximal oxygen consumption was 36.6 ± 12.0 ml*kg-1*min-1. No significant relationship existed between weight gain since age 20 and current cardiorespiratory fitness (r = -0.12). No differences in weight history were observed after classification of participants into high vs. low cardiorespiratory fitness nor high vs. low muscular fitness.
CONCLUSIONS: Current cardiorespiratory and muscular fitness are independent of past body weight history. Despite the limitations of retrospective analysis of weight history and inability to determine previous levels of fitness, these results imply that high fitness might not be protective against age-associated body mass increases, but also that low fitness might not destine an individual to larger than normal gains in body mass

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Anthropometric Characteristics Of Relative Age Effects Among Division 1 Athletes

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Athletes born earlier in the year may experience developmental advantages owing to eligibility cutoff dates in youth sports, typically January 1. Known as relative age effects (RAE), this phenomenon has been described in numerous athletic contexts; however, the proportional contributions of physical development and skill acquisition remain unknown.
PURPOSE: To investigate the occurrence and anthropometric characteristics of RAE in collegiate athletes.
METHODS: We tested 114 athletes (82 men, 32 women) representing 13 sports in a Division 1 athletics program in Northern California. Each subject was tested using the InBody 770 analyzer. We recorded height, weight, BMI, lean body mass, skeletal muscle mass, body fat mass, body fat percentage, lean leg mass, arm circumference, and estimated basal metabolic rate. We tabulated birth months and assigned subjects to their designated quarters (January-March as the first quarter). Multivariate tests including sex as a between-subjects factor were used to identify differences in InBody outcomes based on birth month for the entire sample. Coarsened exact matching was conducted to create subset containing two groups; consisting of subjects born in first three (n=21) and last three (n=21) months, matched by sex and age. Independent samples t-tests were conducted to examine differences in anthropometric measurements between the two groups in the subset.
RESULTS: Across the total sample, 30.7% of athletes were born between January and March; there was a significant difference between sports ($p=0.027$) and a trending difference between sexes ($p=0.071$). Males and females exhibited differences ($p<0.001$) in every anthropometric outcome except BMI ($p=0.123$). There were no differences observed in any variable by birth quarter ($p>0.100$), but peak physical characteristics appeared to exist in the middle months. Independent samples t-tests on the matched subset identified no difference between athletes born in the first three months and those born in the last three months for all anthropometric measures ($p>0.300$).
CONCLUSIONS: Among a diverse set of collegiate sports, our results suggest the existence of RAE corresponding to a January 1 eligibility cutoff may be related more to additional skill acquisition than physical maturation.

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Effects Of High- And Low-load Resistance Training On Body Composition In Recreationally Trained Males

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Resistance training has been shown to improve body composition.
PURPOSE: Determine the effects of resistance training at 30% or 85% of predicted 1-repetition maximum (1-RM) with regards to body mass, body fat percentage, and skeletal muscle mass.
METHODS: 16 recreationally trained males (M_{age} = 20.4 ± 2.7 yrs) were recruited for this study. Participants were randomly assigned to one of two training groups: 30% or 85% of predicted 1-RM. Participants completed three sessions per week of a whole-body workout (back squat, deadlift, bench press, T-row, bicep curls, skullcrushers) over six weeks. Sessions consisted of two warmup sets and three working sets to failure at 30% or 85% of predicted 1-RM. Body composition data including body mass (BM), body fat percentage (%BF), and skeletal muscle mass (SMM) was collected at baseline and the end of the training program. A paired T-Test was used to assess differences in body composition from pre- to post-training. Significance was set a-priori at $P<0.05$.
RESULTS: There was a significant decrease in %BF over the course of the training program ($P=0.01$), however no statistically significant changes were seen in SMM or BM ($P>0.56$).
CONCLUSIONS: Consistent with previous research, resistance training had a significant effect on body composition through a reduction in %BF. Both high- and low-load training contributed to these findings, but it should be noted that there were decreases in %BF in the 30% and increases in the 85% group (-0.75 vs +0.24%) indicating that low-load resistance may result in a more favorable body composition. Additionally, the observed increases in SMM in the 85% group indicate that high-load training may be more influential on improved muscle hypertrophy.

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Development Of A Method For Evaluating Body Composition And Perimeters Using Cell Phone Photos.

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Accurate assessment of body composition requires expensive methods that are inaccessible to most of the population, such as dual-energy X-ray absorptiometry (DXA). Technological advances allowed the creation of an application that uses artificial intelligence and computer vision to assess body measurements (BM) and body fat (%BF) through photos, making it a non-invasive, practical, and affordable method.
PURPOSE: Develop and validate a method for predicting body measurements and body fat from 2D images.
METHODS: To predict BM and BF, two groups of volunteers were evaluated. The variables weight, height and perimeters were evaluated by an Isak level 2 anthropometrist. Four images of the same patient were captured in frontal, posterior, right and left side perspectives. The %BF was measured by DXA (GE, Madison, USA). For prediction of BM, data from perimeters and photos from group 1 were collected (493 adults (327 females) with age 35.5 ± 8.8 years, height 165.6 ± 17.3 cm, weight 67.7 ± 14.0 kg). The data set from the second group (287 adults (157 females) with age 30.8 ± 9.6 years, height 168.8 ± 9.6 cm, weight 71.4 ± 16.0 kg) was used to predict %BF using DXA and real perimeter data as reference. To create the prediction model, 50 independent executions were performed with the shuffled dataset. Each dataset was separated into 80% for training and 20% for final validation. Of these 80%, the sample was separated into 70% for training, and 30% for testing on each independent execution. Bland-Altman analysis was used to assess the agreement between predicted and measured values in the final validation sample.