CONCLUSIONS: Female dancers had generally higher estimated VO2max when compared to ACSM classifications for healthy adults. We only had 30 males across our cohorts, warranting inclusion of more males to develop robust norms in male collegiate dancers. Our collegiate dancers participated primarily in modern/contemporary dance. Still, other styles of dance exist and more work is needed across genres and levels. Prior findings in collegiate dancers found aerobic fitness did not significantly change over the collegiate-academic career, the normative values we found in the current study can be used as baseline aerobic fitness norms in healthy collegiate dancers.

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Fitness Testing Frequency Differs Between Sexes And Across Sports In A Division 1 Athletics Program

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In college athletics programs, individual sports differ widely in resources, attendance, and publicity. Few investigations have examined whether these inter-sport differences influence the individual attention athletes receive by strength trainers and coaching staff.
PURPOSE: To examine if athletes across diverse sports in a Division 1 athletics program experience comparable fitness testing.
METHODS: We tracked comprehensive fitness assessments undergone by 114 Division 1 collegiate athletes representing 6 men's sports (baseball, basketball, soccer, swimming, tennis, and water polo) and 7 women's sports (basketball, field hockey, soccer, swimming, track and field, volleyball, and water polo). Independent-samples t-tests, chi-squared tests, logistic regression, and one-way ANOVA were used, as appropriate, to compare testing frequencies between men and women and across sports.
RESULTS: Men (n=82) were 19.9 ± 1.4 years old; women (n=32) were 20.1 ± 1.7 years old ($p = 0.696$); age was unrelated to testing frequency ($p = 0.569$). Most fitness assessments (71.9%) occurred during fall semester; there was no difference between sexes in time of testing ($p = 0.351$); a difference was observed between sports ($p < 0.001$) with testing dates tracking each sport's season of participation. A single fitness evaluation was experienced by 50.0% of all athletes, the maximum number of testing dates by a single athlete was 32, and the mean number was 3.4 ± 4.6. Men were tested 3.9 ± 5.1 times; women were tested 2.1 ± 2.6 times ($p = 0.014$). 55.4% of men underwent multiple testing dates compared to 35.5% of women ($p = 0.058$). Logistic regression, holding sex and sport constant, found each additional inch of height to predict a 12.4% increase in the odds of undergoing multiple tests ($p = 0.044$; 95% CI of OR: 1.003 to 1.259). One-way ANOVA revealed a difference in testing frequencies between sports ($p < 0.001$): men's tennis (10.4 ± 8.6), men's basketball (5.0 ± 2.2), and women's volleyball (4.1 ± 8.3) had the most frequently evaluated athletes.
CONCLUSIONS: The variance in attention received by collegiate athletes is multifactorial. Some factors that emerged in this study were sex of the athlete and sport the athlete plays. Inconsistency in team fitness assessment may demonstrate performance priorities in collegiate athletic programs.

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The Accuracy Of Four Component Models Using Body Volume Equations And Field-based Water Measurements

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Several recent investigations have been altering the traditional 4 component (4C) model for determining percent fat (%Fat) by using body volume (BV) from dual-energy x-ray absorptiometry (DXA) and total body water (TBW) from bioelectrical impedance analysis (BIA) to avoid using underwater weighing (UWW) and TBW from deuterium oxide dilution.
PURPOSE: To determine the accuracy of using either Db from DXA, TBW from BIA or both in a 4C model to estimate %Fat.
METHODS: A 4C model to determine %Fat was measured using body density (Db) from UWW, bone mineral from DXA and TBW from deuterium oxide dilution in 45 males and females. The Lohman (1986) 4C model equation was used to determine %Fat. BV was calculated from DXA scans using an equation from Wilson (2013) which was used to determine Db. TBW was estimated from BIA using an equation from Evans (2001). An alternate 4C model was created using Db from DXA (4C-DXA Db) and TBW from BIA (4C-BIA TBW) to determine the accuracy of either or both (4C-DXA/BIA) of these compared to the 4C model (4C-Criterion). UWW with residual volume measured simultaneously (by nitrogen dilution) was performed and converted to %Fat (Siri, 1961). A Hologic QDR-1000W was used for DXA bone measurements and BIA (RJL Systems) was performed following standard procedures. Each person was measured in a fasted, rested condition during a single 3-4 hour session.
RESULTS: The sample was 21.0 ± 2.9 years old and weighed 61.3 ± 9.4 kg. %Fat from 4C-Criterion was 18.0 ± 7.2%. Strong ($p<0.05$) associations existed in %Fat between 4C-Criterion versus from UWW and all alternate 4C models (Adj R^2s = 0.829 to 0.919). SEEs from these analyses were 2.05% (UWW) to 2.98% (4C-DXA/BIA). No significant mean differences in %Fat existed (range: -0.033% (UWW) to -0.687% (4C-BIA TBW). Standard deviations of the differences were 2.04% (UWW), 2.39% (4C-DXA Db), 2.46% (4C-BIA TBW), and 3.10% (4C-DXA/BIA). Bland Altman analyses (differences vs 4C-Criterion %Fat) showed nonsignificant slopes except for UWW (r = 0.395) and 4C-BIA TBW (r = 0.299).
CONCLUSIONS: %Fat from 4C-DXA Db did not provide a substantial improvement over using UWW. The highest errors and large individual differences resulted from 4C-DXA/BIA, therefore this practice of substituting BIA TBW and DXA Db should be discouraged.

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Changes In Body Composition For Collegiate Students Over Time Utilizing Dual Energy X-ray Absorptiometry

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PURPOSE: Lean mass, fat mass, and bone mineral density are important determinants of health. The ability to change these values over time are important to overall wellness and also athletic success. The ability of athletes and non-athletes to change body composition over time are important for setting realistic expectations of change over time.
METHODS: 815 college aged students (469) and student athletes (346 Division I athletes from a variety of sports) participated in this longitudinal tracking study (ht. 173.8±6.2 cm, wt. 76.6±29.24 kg, age 20.156±1.73 years, Body fat % 24.06±7.13%). After filling out informed consents and health history questionnaires students were scanned for total body composition utilizing a Dual Energy X-Ray Absorptiometry (DXA) scanner (Lunar Prodigy by GE). Regional and total fat mass, fat free mass, and bone mineral density values were analyzed for change relative to days between scans, results were multiplied by 28 for standardization/monthly projections. Athletes were compared to non-athletes by a one-way analysis of variance.
RESULTS: Overall monthly changes for body fat percentage was 0.00±0.59% with a 95% confidence interval (CI) of 1.18% to -1.20%. Lean mass monthly change was 0.083±0.795kg with a 95% CI of 1.67 to -1.51kg. Fat mass monthly change was 0.001±.495kg with a 95% CI of .99 to .988kg. Finally, bone mineral density monthly change was -.0069±.1014 g/cm^2 with a 95% CI of .196 to -.210g/cm^2. Overall, monthly change mean differences for athletes compared to non-athletes were: lean mass 0.305 kg, fat mass 0.056 kg, body fat -0.002%, and bone mineral density -0.001g/cm$^{2.}$ Athletes compared to non-athletes were on average 1.4kg higher in lean mass, 4.5kg lower fat mass*, and 4.5% lower in body fat percent*, and had .0445g/cm^2 higher bone mineral density*. Where * was significant at P <.001.
CONCLUSIONS: On average changes for body composition were small, but the confidence intervals were much larger. This was an observational study utilizing different testing frequency. More defined body composition change timeline expectations for athletes and non-athletes would be useful for coaches, trainers, and researchers.

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Heart Rate Variability At Rest And During Steady State Exercise In Marathon Training Students

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Heart rate variability (HRV) and heart rate (HR) at rest are known measures of health and adaptability, with higher HRV and lower HR associated with greater parasympathetic tone. While HRV is dramatically reduced during exercise, some research indicates that a relationship between health and/or fitness and HRV can be seen during steady state exercise (SSX).
PURPOSE: To examine the relationship between HRV at rest and during SSX, and to assess whether HR and HRV change in response to marathon training.

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