Southeast Chapter of the AMERICAN COLLEGE OF SPORTS MEDICINE

winter meeting

February 4-5, 1983
University of Florida
Gainesville, Florida

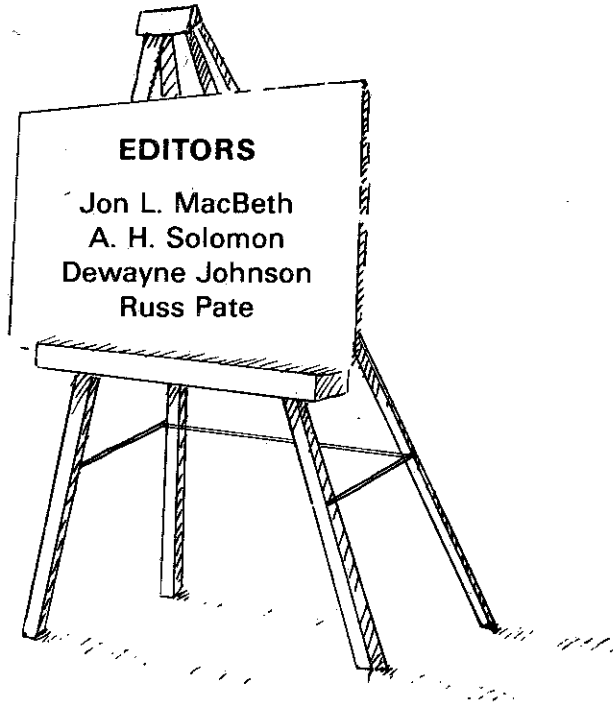
SELECTED RESEARCH ABSTRACTS

Tenth Annual Meeting

Southeastern Regional Chapter of the AMERICAN COLLEGE OF SPORTS MEDICINE

winter meeting

February 4-5, 1983
University of Florida
Gainesville, Florida



CONFERENCE ABSTRACTS
is published by the
Health, Physical Education, Recreation and Safety Department
Middle Tennessee State University
Murfreesboro, Tennessee 37132

PROGRAM

SOUTHEAST CHAPTER
AMERICAN COLLEGE OF SPORTS MEDICINE

ANNUAL MEETING PROGRAM
February 4-5, 1983
Gainesville, Florida

FRIDAY, FEBRUARY 4

7:30 a.m.

REGISTRATION ..... Reitz Union, 3rd Floor

8:30 - 11:30 a.m.

WORKSHOPS

"Application of Microprocessors to Metabolic Measures during Exercise"
Rick Rayfield, Roosevelt University, Chicago, Illinois
Reitz Union ..... Room 346

"Assessment of Habitual Physical Activity"
Steven N. Blair, University of South Carolina, Columbia, South Carolina
Reitz Union ..... Room 361

"Exercise Therapy for Low Back Pain", Jan Hayter, North Florida Regional Hospital, Gainesville, Florida
Reitz Union 349

"Coronary Heart Disease - Treatment, Rehabilitation and Nuclear Techniques"
Richard Conti, Chief of Cardiology, School of Medicine, University of Florida, Gainesville, Florida
Med. Center Auditorium (Meet Reitz Union Lobby)

"Exercise Testing of Patients with Asthma and other Pulmonary Impairments"
Bruce McClenaghan and Anda Berzins, University of South Carolina, Columbia, South Carolina
Center for Physical & Motor Fitness ..... Room 10, Fla. Gym

"Diabetes and Exercise"
Robert B. Vogel, Frederick T. Murray, Diane Morse and Christian Zanner, University of Florida, Gainesville, Florida
Center for Physical & Motor Fitness ..... Room 13, Fla. Gym

"Exercise and Aging"
Jack Mahurin, Stephen Dodd, Janet McNaughton, Robert Collins and Lochia Farrar, Mississippi State University, Starkville, Mississippi
Reitz Union ..... Room 363

11:30 a.m. - 1:00 p.m.

REGISTRATION & LUNCH (on your own)

1:00 - 2:45 p.m.

SYMPOSIUM ..... Reitz Union Auditorium

"Sex Differences in Exercise Performance"
Christian Wells, Arizona State University, Tempe, Arizona and Emily Haymes, Florida State University, Tallahassee, Florida

Presider: Russell R. Pate, University of South Carolina, Columbia, South Carolina

3:00 - 4:00 p.m.

MINI-SESSION, GROUP A

"Implementation of the Exercise Prescription"
Tommy Boone, University of Southern Mississippi, Hattiesburg, Mississippi
Reitz Union ..... Room 346A

"Laboratory Methods in Measurement of Gas Exchange during Exercise"
Bruce Gladden, University of Louisville, Louisville, Kentucky
Reitz Union ..... Room 346B

"Sleep Phenomena and Physical Activity", Wilse Webb, University of Florida, Gainesville, Florida
Sleep Lab — Space Science Bldg. (Meet Lobby Reitz Union)

"Fitness and Health Enhancement Programs in Education, Hospital and Business/Industry Settings", Lauve Metcalfe
Reitze Union ..... Room 349

"Therapeutic Exercise Programs for Persons with Peripheral Vascular Disease", Christine Boyd, University of Florida, Gainesville, Florida
Reitz Union ..... Room 361

"Aquatic Rehabilitation of Coronary Artery Disease Patients", George Bell, Virginia Tech, Blacksburg, Virginia
Reitz Union ..... Room 363

4:15 - 5:15 p.m.

MINI-SESSION, GROUP B

"ACSM Fitness Instructor Certification"
Edward Howley, University of Tennessee, Knoxville, Tennessee
Reitz Union ..... Room 349

"Orthopedic Services to Athletics"
Phil Parr and Peter Indelicato, Gainesville, Florida
Sports Med. Center Stadium (Meet Lobby Reitz Union)

"Body Fluids: Theoretical and Practical Considerations in Exercise Research"
Robert McMurray, University of North Carolina, Chapel Hill, North Carolina, William Herbert and Fred Goss, Virginia Tech, Blacksburg, Virginia
Reitz Union ..... Room 346A

"Endorphins and Exercise"
Mark Davis, University of South Carolina, Columbia, South Carolina
Reitz Union ..... Room 346B

"Exercise Rehabilitation for Severely Disabled Cardiac Patients"
Wiliam Webster, Greenville General Hospital, Greenville, South Carolina
Reitz Union ..... Room 361

7:00 - 8:30 p.m.

KEYNOTE ADDRESS — Gannett — College of Journalism Bldg. (Across from Reitz Union)

"Theories of Aging - Implications for Exercise Programming"
Leonard Hayflack, University of Florida, Gainesville, Florida

Presider: David Kaufmann, University of Florida, Gainesville, Florida

8:40 - 10:00 p.m.

SOCIAL Center for Physical & Motor Fitness, Fla. Gym

9:30 - 10:45 a.m.

FREE COMMUNICATIONS

GROUP A ..... Reitz Union, 346

9:30 a.m.

"Association of Alcohol, Diet and Smoking Changes with Increased Physical Fitness"
Steven N. Blair and N. Goodyear, Institute for Aerobics Rsearch and the School of Public Health, University of South Carolina, Columbia, South Carolina

9:45 a.m.

"Do Small Incremented Bike and Treadmill GXT's Yield Similar Estimates of Anaerobic Threshold?"
Alan D. Moore, Jr., Wiliam G. Herbert, Dennis E. Hinkle and Don R. Sebolt, Virginia Tech, Blacksburg, Virginia

10:00 a.m.

"Effects of Aerobic Dance on Physical Work Capacity, Cardiovascular Function and Body Composition of Middle-Aged Women"
Deborah B. Dowdy, University of Georgia, Athens, Georgia

10:15 a.m.

"Validity of Running Tests of 4, 8, and 12 Minutes Duration in Estimating Aerobic Power for College Women of Different Fitness Levels"
Jeffery J. Dorociak, Columbia College, Columbia, South Carolina

10:30 a.m.

"Cardio-respiratory Efficiency at Submaximal Work in Young and Middle-Aged Women"
C. W. Zauner, M. Notelovitz, C. Fields, K. Clair, W. Clair and R. Vogel, University of Florida, Gainesville Florida

GROUP B ..... Reitz Union 349

9:30 a.m.

"Tissue Damage and Long Distance Racing"
A. J. Mahurin and S. L. Dodd, Mississippi State University, Mississippi

9:45 a.m.

"The Effect of Methandrostenolone and Weight Training on Strength Development, Lean Body Mass and Body Composition"
Michael S. Fronsoe, G. F. Knadler, J. Ivy, W. M. Sherman, W. Miller, B. Lynn, University of South Carolina, Columbia, South Carolina

10:00 a.m.

"Effects of Epinephring and Norepinephrine Infusion on Blood Lactate and on Muscle Lactate and O2 Exchange"
W. N. Stainesby, C. Summers and G. M. Andrew, University of Florida, Gainesville, Florida

10:15 a.m.

"The Effect of Physical Training on Selected Parameters of the Human Immunological System"
Cindy A. Books, C. W. Zauner and P. O. Teague, University of Florida, Gainesville, Florida

10:30 a.m.

"Clinical Characteristics and Diagnosis of Hematuria in Athletes"
Pu Jun-Zong and Kao Yunchiu, Institute of Sports Medicine, Beijing Medical College, Beijing, Peoples Republic of China

11:00 a.m. 12:30 p.m.

SYMPOSIA

"Physiological Aspects of Workers at the Nation's Space Port"
Diane Spitler, G. W. Hoffler, D. F. Doerr, M. A. Frey and P. Buchanan, Biomedical Research Laboratories, Kennedy Space Center, Florida
Reitz Union ..... Room 349

"Metabolic Characteristics of Muscle: Skeletal and Cardiac"
Wendell Stainsby, University of Florida, Gainesville, Florida, and Charles Riggs, Florida State University, Tallahassee, Florida
Reitz Union ..... Room 346

"Psychological Aspects of Sport Performance"
David Pargman, Florida State University, Tallahassee, Florida
Reitz Union ..... Room 361

"Sport Biomechanics"
Richard Hinrichs, University of South Carolina, Columbia, South Carolina; Stephen Messier, Wake Forest University, Winston-Salem, North Carolina; Barry Frishberg, South Carolina State College, Orangeburg, South Carolina; Jerry Wilkerson, University of North Carolina, Greensboro, North Carolina; Terry Ward, Tallahassee, Florida
Reitz Union ..... Room 363

12:40 - 2:00 p.m.

BUSINESS MEETING AND LUNCHEON

Luncheon Speaker: "The Sunshine Games - A Model State Level Olympics"
Jimmy Carnes, Florida Governor's Council on Physical Fitness, Tallahassee, Florida

Saturday, February 5
7:45 - 9:30 a.m.

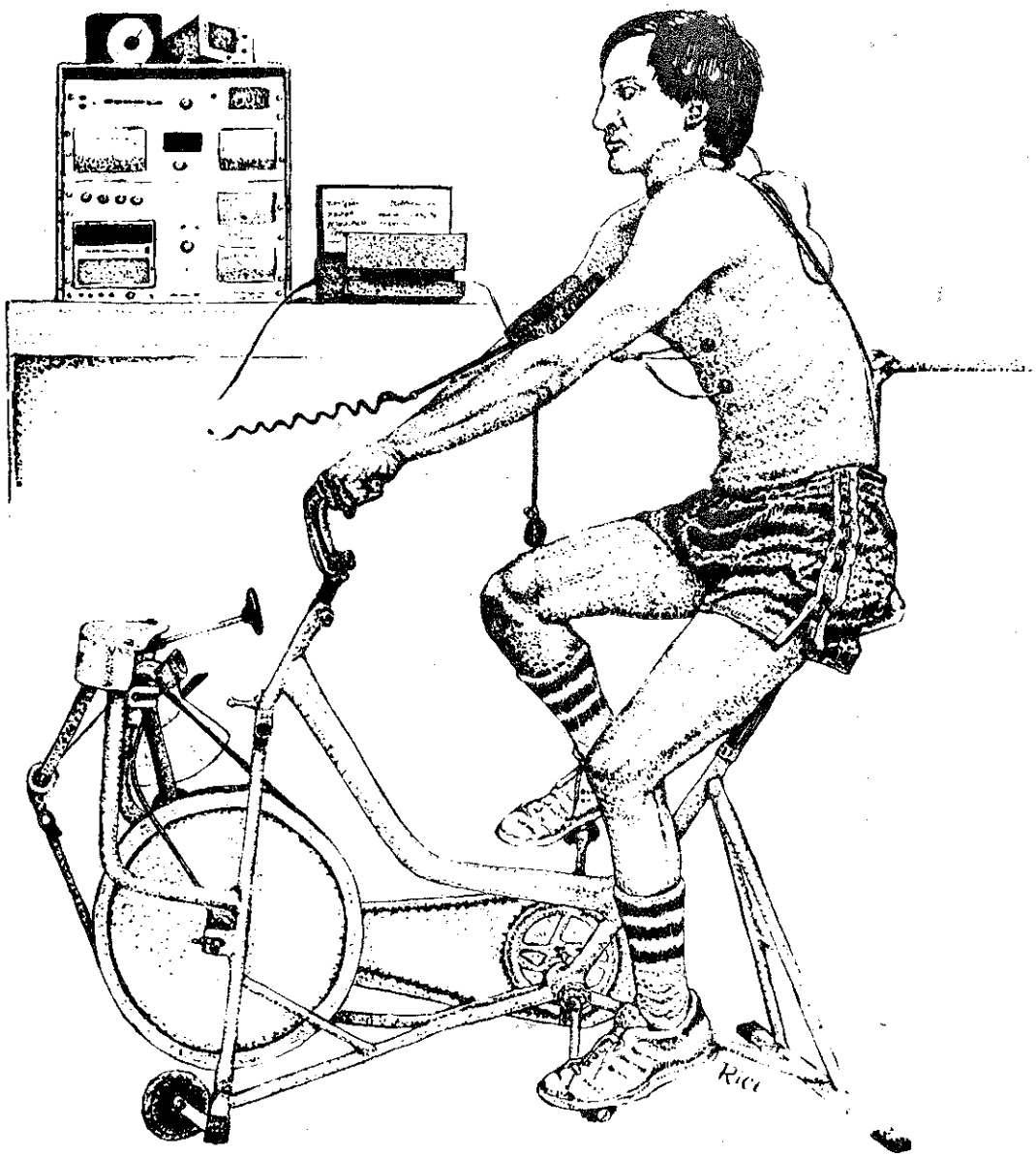
POSTER PRESENTATIONS ..... Rooms 346, 349, 361, 362, 363 Reitz Union

Our thanks to:
David Kaufmann
CONVENTION COORDINATOR

SEACSM PROGRAM

Free Communications
Poster Presentations
Lab Tours

Symposia
Workshops
Mini-Sessions



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Hosted by The University of Florida, Gainesville, Florida
At the Reitz Memorial Union

ASSOCIATION OF ALCOHOL, DIET AND SMOKING CHANGES WITH INCREASED PHYSICAL FITNESS

S. N. Blair and N. Goodyear, Institute for Aerobics Research and the School of Public Health, University of South Carolina 29208

Associations between physical activity level and disease end points are often confounded by the possibility that physically active persons differ from non-active persons on health habits other than exercise. The purpose of this study is to compare the dietary, smoking, and alcohol intake habits of individuals who voluntarily increased their physical fitness level with other individuals who did not increase their physical fitness. Subjects were 922 middle-aged ($\bar{X}$ 43 years) men who had two examinations at a preventive medicine clinic one to six years apart. An exercise treadmill test (Balke) and a lifestyle questionnaire were administered at both visits. Based on treadmill performance between baseline and follow-up, subjects were retrospectively assigned to two fitness groups: high fitness (HF), treadmill time increase at least two minutes ($\bar{X}$ difference 279 $\pm$ 144 seconds); and low fitness (LF), treadmill time increase less than one minute ($\bar{X}$ difference - 48 + 88 seconds). All subjects were initially sedentary and free of disease. Fifteen lifestyle variables were evaluated for differences at follow-up: number of weekly servings of eggs, pork, beef, fish, fowl, fried foods, skim milk, whole milk, 2% milk, tea, coffee, wine, liquor, beer, and smoking status. At baseline the two fitness groups were similar on age, body mass index and educational level. Signficant baseline differences existed between the two fitness groups only on smoking ($p < .003$), and whole milk consumption ($p < .003$). The Grizzle, Starmer, and Koch (GSK) method of analysis was performed to test the effect of fitness group on changes in health habits. Positive changes in health habits were seen for both groups. Statistically significant changes in health habits between fitness groups included smoking ($p = .0002$, HF group more likely to remain nonsmokers and less likely to continue smoking); coffee drinking ($p = .002$, HF group more likely to decrease weekly consumption); and beef consumption ($p = .009$, HF group more likely to decrease weekly servings). Results of this study indicate that persons who voluntarily increase their physical fitness level differ little in dietary and alcohol habits from persons who maintain a more sedentary lifestyle, and smokers are less likely to increase their physical fitness than non-smokers.

NOTES AND COMMENTS

DO SMALL INCREMENTED BIKE AND TREADMILL GXT'S YIELD SIMILAR ESTIMATES OF ANAEROBIC THRESHOLD?

Alan D. Moore, Jr., William G. Herbert, Dennis E. Hinkle, and Don R. Sebolt. Human Performance Laboratory, Virginia Tech, Blacksburg, VA 24061

Three widely accepted ventilatory or gas exchange predictors of anaerobic threshold (AT) were evaluated under two different modes of graded exercise (bike ergometer: GXT_B, and treadmill: GXT_T) to determine if these methods would yield equivalent AT values. Nineteen young adult males performed both tests in the same lab session. The order of participation was counterbalanced among subjects and 20-30 min separated the tests. For GXT_B the power output was increased 30 $W \cdot min^{-1}$ in 10 W steps every 20 s. For GXT_T subjects started at an initial exercise level requiring an oxygen uptake of approximately 14 $ml \cdot kg^{-1} \cdot min^{-1}$ (4 METS) and a speed-grade increment was applied every 20 s to increase the demand by 3.5 $ml \cdot kg^{-1} \cdot min^{-1}$ so that the metabolic loading rate was similar to that for the average weight subject on the bike. Ventilatory and gas exchange measurement intervals were synchronized with the load increment intervals. Gas fractions were averaged over each 20 s interval from expired gases mixed in a 4.0 l baffled chamber. The AT indices included: a non-linear increase in $\dot{V}_E$ ($AT_{\dot{V}E}$); an increase in F_EO_2 without a decrease in F_ECO_2 (AT_{FEO2}); and an increase in $\dot{V}_E/\dot{V}O_2$ without a decrease in $\dot{V}_E/\dot{V}CO_2$ ($AT_{\dot{V}E/\dot{V}O2}$). AT values (%$\dot{V}O_2$max) using the three indices for both modes were analyzed with a two x three repeated-measures ANOVA. Means (±SE) of each cell were:

	$AT_{\dot{V}E}$	AT_{FEO2}	$AT_{\dot{V}E/\dot{V}O2}$
GXT_B	54.4 ± 1.5	50.5 ± 1.7	50.0 ± 1.8
GXT_T	53.3 ± 2.7	37.1 ± 2.4*	36.5 ± 2.3*

*$p \leq 0.01$

The results indicate the use of $\dot{V}_E$ as an index yields similar AT values. The three indices were consistent in predicting AT within the cycling exercise mode, but not within the treadmill mode, i.e., AT_{FEO_2} and $AT_{\dot{V}E/\dot{V}O2}$ were of suspect validity. These findings suggest a mode-related specificity of respiratory metabolic dynamics in bike vs. treadmill graded exercise.

NOTES AND COMMENTS

EFFECTS OF AEROBIC DANCE ON PHYSICAL WORK CAPACITY, CARDIOVASCULAR FUNCTION AND BODY COMPOSITION OF MIDDLE-AGED WOMEN

Deborah B. Dowdy, Human Performance Lab, Stegeman Hall, University of Georgia, Athens, GA 30602

The purpose of the study was to determine the effects of aerobic dance on physical work capacity, cardiovascular function and body composition of middle-aged women. $\dot{V}O_{2max}$, heart rate during submaximal treadmill walking, resting heart rate and blood pressure, and body composition were determined before and after a 10-week aerobic dance conditioning program in 28 women (18 experimental and 10 control), aged 25 to 44 years. During the 10-week treatment period, the experimental group (E) participated in 45 minutes of aerobic dance that utilized 70-85% of the heart rate reserve, 3 days/wk, whereas the control group (C) continued their normal physical activity pattern. $\dot{V}O_{2max}$ increased significantly ($p < .05$) in E by 0.142 ℓ/min (6%) or 1.8 ml/kg·min (5%), whereas C decreased significantly ($p < .05$) by 0.117 ℓ/min (6.0%) and 2.5 ml/kg·min (7.7%). Time on the modified Balke treadmill test increased significantly by 2.1 minutes in E, and did not change in C. Heart rate at submaximal workloads on the treadmill test decreased 14-18 beats/min in E and increased 1-4 beats/min in C. Resting heart rate and systolic blood pressure decreased significantly in E by 5 beats/min and 6mm Hg, respectively, but did not change in C. Body weight; % fat, fat weight, and fat-free weight estimated using hydrostatic weighing; sum of 7 skinfolds and sum of 7 circumferences did not change significantly in either E or C. It was concluded that a 10-week aerobic dance program produces small but significant improvements in physical work capacity and cardiovascular function, but without dietary control, does not alter body composition in sedentary middle-aged women.

NOTES AND COMMENTS

VALIDITY OF RUNNING TESTS OF 4, 8, and 12 MINUTES DURATION IN ESTIMATING AEROBIC POWER FOR COLLEGE WOMEN OF DIFFERENT FITNESS LEVELS

Jeffery J. Dorociak, Columbia College, and Jack K. Nelson, Louisiana State University 29203

Distance run tests have become popular field measures of aerobic power. However, there have been two major limitations in past research concerning the validity of distance runs as predictors of max $\dot{V}O_2$. Most of the work has been done with male subjects and only one project has evaluated the effects of the subject's level of fitness. Consequently, this study investigated the validity of three field tests, the 4, 8, and 12-minute runs, as estimations of aerobic power for college age women of different fitness levels. Forty-eight females served as the subjects (N=17 beginning joggers, N=19 intermediate joggers, and N=12 track runners). Max $\dot{V}O_2$ was measured by standard open circuit spirometery. Correlations were computed between max VO_2 and each of the three distance runs. The three distance runs took place on an indoor 220 yd. track and were measured to the nearest meter. ANOVA revealed that the three groups differed in max $\dot{V}O_2$ scores and distance run scores. For all three groups, significant validity coefficients ($p < .05$) were obtained between max VO_2 and the 4, 8, and 12-minute run. It was found that the 12-minute run had the highest correlation with max VO_2 for the beginning runners. For the intermediate runners, any of the three distance runs can be used with equal confidence to estimate aerobic power. The 8-minute run had the strongest relationship with max VO_2 for the more advanced runners. When the data were pooled, the correlation between max $\dot{V}O_2$ and the three runs were quite high and essentially the same (4-minute run r=.86, 8-minute run r=.87, 12-minute run r=.89). This indicates that any of these three distance runs is equally accurate in estimating aerobic power for subjects of highly divergent fitness levels.

NOTES AND COMMENTS

CARDIO-RESPIRATORY EFFICIENCY AT SUBMAXIMAL WORK IN YOUNG AND MIDDLE-AGED WOMEN

C. W. Zauner, FACSM, M. Notelovitz, C. Fields, K. Clair, W. Clair, and R. Vogel. Center for Physical and Motor Fitness, University of Florida, Gainesville, FL 32611

Seventeen middle-aged women ($\bar{x}$ age= 48.7 yrs.) and eighteen younger women ($\bar{x}$ age= 24.7 yrs.) were studied while walking at 3.0 mph and 5% grade on a motorized treadmill. This exercise task was submaximal for all subjects. The women were physically active, those younger involved with jogging or swimming and those middle-aged with either walking, jogging, tennis or resistance training. Prior to initiation of treadmill exercise, body weight (BW) was established. During the standardized submaximal exercise (submax) subjects were evaluated for expired volume in one minute ($\dot{V}_E$), frequency of breathing (fb), tidal volume ($\dot{V}_T$), oxygen uptake ($\dot{V}_{02}$), heart rate (HR), oxygen pulse (0_2P) and ratio of $\dot{V}_E$ to $\dot{V}_{02}$ ($\dot{V}_E/\dot{V}_{02}$). Following measurements at submax, subjects were brought to maximal exercise and the $\dot{V}_{02}$ was again assessed at that point ($\dot{V}_{02\,max}$). The younger women demonstrated a significantly ($P<0.01$) greater mean $\dot{V}_{02max}$ (43.51 ml/kg.min^{1}) than that of the middle-aged subjects (27.25 ml/kg·min^{1}), and significantly ($P<0.01$) lower means for $\dot{V}_E$, HR, $\dot{V}_E/0_2$, all at submax, as well as a significantly ($P<0.01$) smaller BW. Furthermore, the younger women showed a significantly ($P<0.05$) lower $\dot{V}_{02}$ expressed in milliliters per minute ($\dot{V}_0$ ml/min) at submax than did their middle-aged counterparts. However, there was no significant mean difference in $\dot{V}_{02}$ at submax when divided by BW ($\dot{V}_{02}$ ml/kg·min^{1}). The younger women also demonstrated greater efficiency at submax as illustrated by the lower $\dot{V}_E/\dot{V}_{02}$. The superior efficiency of the younger women at submax seems, therefore, to be largely a function of their smaller BW. This is illustrated by the lower mean $\dot{V}_{02}$ ml/min in the younger subjects without significant differences in either $\dot{V}_{02}$ ml/kg·min^{1} or 0_2P. It is concluded that the age associated reduction in cardio-respiratory efficiency observed in this study is due primarily to weight gain rather than to actual systems degeneration.

Supported by grants from Mead-Johnson Laboratories and from Nautilus Sports/ Medical Incorporated.

NOTES AND COMMENTS

TISSUE DAMAGE AND LONG DISTANCE RACING

A. J. Mahurin and S. L. Dodd. Department of Health, Physical Education and Recreation. Mississippi State University, MS 39762

A study was undertaken in an effort to detect the relationship between known indicators of tissue damage and the length of long distance races. Resting blood serum aldolase, lactate dehydrogenase (LDH), creatine phosphokinase (CPK), glutamic oxaloacetic transaminase (GOT), and glutamic pyruvic transaminase (GPT) concentrations were determined by analyzing samples from rested competitive long distance runners. Additionally, venous blood samples were drawn from 13 to 16 male long distance runners immediately following races of 6.2, 10, 15.5 and 26.2 miles and a 2-hour run for distance. Each was analyzed for the above listed serum enzyme components. Post-race aldolase concentrations were found to correlate best ($r = .832$) with the distance raced. The correlations of CPK and LDH concentrations with race distances were $r = .548$ and $r = .513$, respectively. GOT and GPT showed correlations of $r = .361$ and $r = .171$, respectively and did not provide significant increases in the multiple correlations of serum enzyme predictability of distance raced ($< 1\%$). CPK and aldolase markedly increased as the race distance exceeded 25 kilometers. Mean CPK concentrations best depict this abrupt change, supporting the hypothesis that running distances greater than 15 miles produces a greater stress than running 10 kilometers. The data indicate that periodic blood serum evaluations may allow training loads to be controlled on an individual basis and possibly avoid the adverse consequences of over-training.

NOTES AND COMMENTS

THE EFFECT OF METHANDROSTENOLONE AND WEIGHT TRAINING ON STRENGTH DEVELOPMENT, LEAN BODY MASS, AND BODY COMPOSITION

M. S. Fronsoe, G. F. Knadler, J. Ivy, W. M. Sherman, W. Miller, B. Lynn, Human Performance Lab., University of South Carolina 29208

The effects of strength training and daily administration of an anabolic steroid on muscular strength, muscular endurance, body composition and limb girth sizes were investigated. Three male college students exercised 3 days per week for 5 weeks and were administered 10 mg of methandrostenolone daily. Three sets of 6-8 repititions of 11 isotonic strength exercises utilizing all of the major body parts were performed on "free" weights and nautilus and universal exercise machines. Three college students performed the same strength training but were administered a "look-alike" placebo. All subjects were weighed in air, underwater weighed and had 5 limb girths measured before and immediately following the 5 week training period. Isotonic strength of the legs and chest, isokinetic strength and endurance of the quadriceps and isokinetic strength of the biceps was also evaluated pre- and post-training. Results failed to show any significant differences between the two groups in any of the measures of body composition, girth size, isotonic strength, isokinetic strength or isokinetic endurance. In spite of the lack of statistical significance, it was noted that 27 of the 28 perameters that were studied demonstrated changes in favor of the steroid group. Some implications of this investigation with reference to procedural changes for future research projects are discussed.

NOTES AND COMMENTS

EFFECTS OF EPINEPHRINE AND NOREPINEPHRINE INFUSION ON BLOOD LACTATE AND ON MUSCLE LACTATE AND 02 ECHANGE

W. N. Stainsby, C. Sumners and G. M. Andrew. Department of Physiology, University of Florida, Gainesville, FL 32610

These experiments were designed to determine the effects of epinephrine (E) and norepinephrine (NE) infusions on blood lactate concentrations (C_{aL} and C_{vL}), and on net lactate output ($\dot{L}$) and O_2 uptake ($\dot{V}_{O2}$) by resting and contracting muscle. In anesthetized dogs with controlled respiration, the venous outflow of the gastrocnemius-plantaris muscle group was isolated, the tendon was connected to an isometric lever and a stimulator was connected to the cut motor nerve. Arterial and muscle venous blood samples were obtained at times 0, 10, 20, 30, 35 and 40 minutes and analyzed for lactate and O_2 concentration. E (n = 3) and NE (n = 3) were infused intravenously at a rate of 1.5 ± 0.1 µg/kg min beginning at minute 11 and continued for the remainder of the experimental period. Isometric twitch contractions, 4/sec, began at minute 31 and continued through minute 40. Neither infusate caused a significant change in $\dot{V}_{O2}$ or $\dot{L}$ while the muscles were at rest. E infusion was associated with a continuous rise in C_{aL} and C_{vL} throughout the infusion period. During contractions $\dot{L}$ and $\dot{V}_{O2}$ were increased, but the values obtained were the same for either E or NE infusion. Comparison of $\dot{L}$ obtained from both infusions (n = 6) in this study with $\dot{L}$ in an identical series of experiments without infusion (n = 7) (R.W. Barbee, W.N. Stainsby and S.J. Chirtel, submitted) showed $\dot{L}$ to be significantly elevated by the infusion of E and NE from a mean value of 0.64 µmol/g min without infusion to a mean value of 1.02 µmol/g min with infusion in this study. The results indicate that plasma E level influences blood lactate concentration and that both E and NE can significantly increase $\dot{L}$ during contractions. (Supported by NIH Grant AM 30187)

NOTES AND COMMENTS

THE EFFECT OF PHYSICAL TRAINING ON SELECTED PARAMETERS OF THE HUMAN IMMUNOLOGICAL SYSTEM

C. A. Books, C. W. Zauner, FACSM, and P. O. Teague. Center for Physical and Motor Fitness, University of Florida, Gainesville, FL 32611

Circulating levels of immunoglobins G (IgG), A (IgA), and M (IgM), cortisol, peripheral white blood cell counts (WBC) and relative and absolute concentrations of T and B lymphocytes were studied in 31 human male volunteers, 20 to 30 years of age, representing 3 levels of endurance training status: competitive runners (n=12), active runners (n=12), and inactive control subjects (n=7). Aerobic fitness levels were substantiated by measurement of maximal oxygen uptake ($\dot{V}O_{2max}$) using a progressive treadmill test (Balke protocol for active and inactive subjects, modified Taylor for competitive subjects). Blood samples were collected at rest between 7:35 A.M and 8:05 A.M. and were separated by not more than 7 days from exercise testing. Significant differences were found among all groups for mean $\dot{V}O_{2max}$ ($p < 0.05$) with the following means demonstrated: competitive, 66.67 ml/kg·min^{-1}; active, 51.22 ml/kg·min^{-1}; inactive, 40.91 ml/kg min^{-1}. No significant differences were found among the groups for mean IgG, IgM, or IgA levels. Mean cortisol level of competitive runners was significantly higher than in active runners ($p < 0.05$) but not than in control subjects. Mean WBC counts were higher for inactive subjects than for both active ($p < 0.05$) and competitive runners. No significant differences existed in mean absolute concentrations of total, B, or T lymphocytes among groups. A positive correlation ($p < 0.05$) was found between $\dot{V}O_{2max}$ and relative T lymphocyte count for the hyperactive group ($r=0.746$) and a negative correlation ($p < 0.05$) was found between these 2 parameters for the active group ($r=-0.738$). Results suggest that physical training has neither a favorable nor detrimental effect on human cellular or humoral immunity. Higher plasma cortisol levels seen in competitive runners may suggest a chronic response to frequent exercise. Lower WBC counts seen in trained subjects probably reflect increases in plasma volume due to training. A significant positive relationship between relative T lymphocyte concentration and $\dot{V}O_{2max}$ in the highly trained individuals and interrelationships between the selected parameters within groups suggests there may be an optimal level of training which results in favorable alterations in the human immunological system.

NOTES AND COMMENTS

CLINICAL CHARACTERISTICS AND DIAGNOSIS OF HEMATURIA IN ATHLETES

Pu Junzong and Kao Yunchiu, Institute of Sports Medicine, Beijing Medical College, Beijing, Peoples Republic of China. 29208

One hundred and twelve cases of hematuria in athletes were reported. By means of a carefully taken history and by examination of the urinary and other systems these cases were diagnosed as follows: 55 cases (49.1%) of exercise hematuria, 16 cases (14.3%) of urinary stones, 18 cases (16.0%) of glomerulonephritis, 13 cases (11.7%) of urinary tract infection and 10 cases (8.9%) of direct contusion to the kidney, anomalies of the kidney and exertional hemoglobinuria. Common causes of hematuria in young people are tuberculosis of the kidney, kidney stone, nephritis and urinary infection. In 112 cases of hematuria in athletes, 47 cases (42.0%) had come from stones of the urinary tract, nephritis and urinary infection. So before the diagnosis of exercise hematuria is considered stones of the urinary tract, nephritis and urinary infection should first be ruled out. From 55 cases of exercise hematuria, the clinical characteristics were summarized as follows: 1. In trained athletes or in apparently healthy individuals sudden appearance of hematuria after physical exercise or sport is usually related to workload. 2. Except hematuria, no special symptoms or clinical findings are found. 3. The condition is most likely to occur in male runners and jumpers. 4. Examination of the urinary tract, blood and x-ray are normal. 5. The duration of hematuria in the majority of subjects (about 90%) is not longer than three days. 6. In a few subjects hematuria may recur occasionally over several years, however the prognosis for these cases is quite good.

A possible mechanism of exercise hematuria is compression of the kidney and straining and/or kinking of it's veins as may occur with heavy pounding, bending or straightening during exercise, especially in the upright position. Exercise hematuria may be treated by Western and/or traditional Chinese medical techniques.

NOTES AND COMMENTS

THE ENERGY COST OF ROPE SKIPPING AT VARIOUS INTENSITIES IN INDIVIDUALS OF AVERAGE PHYSICAL CONDITION

Blanche W. Evans, Rosenthal Human Performance Laboratory, UNC-Greensboro, Greensboro, North Carolina 27412

The purpose of this study was to determine the energy cost of rope skipping at moderate intensities in individuals of average physical condition. Twenty-five male and female volunteers completed between two and five rope skipping workbouts. One five-minute workbout was performed at each session with only one session completed per day. Subjects used a double-footed rebound while jumping in time to a metronome set at a specified rate (80,90, 100,110,120 skips · min $^{-1}$). Physiological measures were evaluated during the last two minutes of each workbout. The range in mean values for the total sample were : $\dot{V}O_2$($l \cdot min^{-1}$) 1.868 to 2.280; $\dot{V}O_2$ ($ml \cdot kg^{-1} \cdot min^{-1}$) 31.50 to 37.68; HR ($beats \cdot min^{-1}$) 168 to 182; $\dot{V}E$ 55.32 to 65.93; caloric cost ($KCAL \cdot min^{-1}$) 9.4 to 11.5; METS 9.0 to 10.7. Significant differences ($P < .05$) between 80 and 120 $skips \cdot min^{-1}$ were found for the total group for $\dot{V}O_2$($l \cdot min^{-1}$) and $\dot{V}O_2$($ml \cdot kg^{-1} \cdot min^{-1}$). No significant differences were detected for males. Significant differences ($p < .05$) due to sex were found for $\dot{V}E$, $\dot{V}O_2$($l \cdot min^{-1}$), $\dot{V}O_2$($ml \cdot kg^{-1} \cdot min^{-1}$) and HR. Females were lower than males in $\dot{V}E$, $\dot{V}O_2$($l \cdot min^{-1}$) and $\dot{V}O_2$($ml \cdot kg^{-1} \cdot min^{-1}$), but higher in HR for all skipping rates. No differences were found in values due to interaction of sex and skipping rate. In conclusion, low intensity skipping rates produce substantial physiologic stress as evidenced by the MET requirements and HR response of subjects in this study. Further study is needed to develop a logical and safe sequence for exercise progression and prescription.

Supported by UNC-Greensboro Research Council Grant #0-2-110-260-7390.

NOTES AND COMMENTS

PHYSIOLOGICAL AND PERCEIVED ATTITUDINAL CHANGES DURING PHYSICAL EDUCATION CONDITIONING COURSES

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The effects of a 14-week conditioning program on physiological and perceived attitudinal changes were investigated in 22 male and 59 female university students. Volunteer participants in the study were elicited from five physical conditioning classes and one bowling class which served as a control group. The Secord-Jourard Body-Cathexis Scale, Profile of Mood States, and Feelings about Running Questionnaire were administered to all classes at the beginning and end of the fall semester. In addition, Ss enrolled in the conditioning courses were timed twice on the 1.5 mile run to assess improvement in cardiorespiratory fitness. Pre-posttest data from each class singly and in combination were subjected to a series of t-tests with adjusted alpha level. Ss in four of the five conditioning classes improved significantly on the 1.5 mile run ($p<.005$). When all data were combined, there was a significant decrease on the Tension-Anxiety factor of the POMS index factor ($p<.01$). Excluding the bowling data from the analysis resulted in a higher level of significance on the Tension-Anxiety factor ($p<.003$). Members of one conditioning class showed a significant increase on the Vigor factor of the POMS index ($p<.04$). A significant increase in positive feelings about running was noted in another conditioning group ($p<.01$). No significant pre-posttest differences were observed in the control group.

A MANOVA conducted to determine the relationship between class and body cathexis, feelings about running, timed run, and POMS factor scores produced no significant results. Based on the findings of the present study, it was concluded that a semester of physical conditioning decreased perceived tension-anxiety and significantly improve running performance.

NOTES AND COMMENTS

MILD AND MODERATE HYPERTENSION: DOES FITNESS CHANGE MAKE A DIFFERENCE?

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This study tested the hypothesis that increased fitness has a lowering effect on elevated blood pressure. Data for the analysis had been previously collected. Study subjects included adult (18-75 years) male (n=144) patients of a preventive medicine clinic who presented with above normal blood pressure (systolic $>$ 140 or diastolic $>$ 90) at their first clinic visit and who had a repeat physical examination 1-1½ years later. Based on treadmill performance changes (Balke procedure) from baseline to follow-up, subjects were retrospectively categorized into two groups: high fitness ($\geq$ 2 minute increase) and low fitness ($\leq$ 1 minute increase). At baseline both groups were sedentary, free of disease, and equivalent with respect to age, systolic and diastolic blood pressures and weight. A split plot repeated measures analysis adjusted for age was performed to test for a group and/or time effect on blood pressure. No significant difference in either systolic or diastolic blood pressures were seen between the two fitness groups. Although systolic ($p < .0009$) and diastolic blood pressures decreased over time in both groups, these decreases might be due to regression toward the mean or to a testing effect. Results of this study suggest that increased fitness does not lower blood pressure. Given the clinical importance of determining the existence of a therapeutic effect of exercise on elevated blood pressure, additional studies of an experimental nature are needed to confirm the findings of this study.

NOTES AND COMMENTS

PREDICTING 10-K RACE PERFORMANCE

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THE PURPOSE OF THIS STUDY WAS TO DETERMINE WHETHER 10-K ROAD RACE PERFORMANCE CAN BE PREDICTED FROM TRAINING INFORMATION AND PRIOR RACE PERFORMANCE. DATA WERE TAKEN FROM OFFICIAL RESULTS (CORROBORATED FROM VIDEO TAPE ANALYSIS) AND REGISTRATION MATERIALS FROM THE 1981 AND 1982 COOPER RIVER BRIDGE RUNS (1724 FINISHERS IN 1982). SEVERAL REGRESSION MODELS WERE DEVELOPED IN AN EFFORT TO DEVELOP THE BEST PREDICTOR. THE MOST POWERFUL SINGLE PREDICTOR OF 1982 RACE PERFORMANCE WAS THE PREVIOUS YEAR'S RACE TIME. THIS CORRELATION WAS SURPRIZINGLY HIGH (.92 FOR MALES; .90 FOR FEMALES), ALTHOUGH THERE WAS CONSIDERABLE PREDICTION ERROR. THE STANDARD ERROR OF ESTIMATE (SEE) FOR MALES IN THIS TWO-VARIABLE MODEL WAS 2.66 MINUTES. THE CORRESPONDING VALUE FOR FEMALES WAS 2.75 MINUTES. THE INCLUSION OF TRAINING INFORMATION (MILES/WEEK, SELF REPORT) INTO A THREE-VARIABLE MODEL RESULTED IN ONLY A MARGINAL IMPROVEMENT IN THE PREDICTION OF RACE TIME. PREDICTABILITY WAS ENHANCED CONSIDERABLY WHEN THE MODELS WERE RESTRICTED TO THE HIGH LEVEL PERFORMERS (FIRST 50 FINISHERS FOR EACH SEX). THE CORRELATION BETWEEN 1981 AND 1982 TIMES WAS .86 FOR THE MALES WITH A SEE OF .83 MINUTES. THE CORRESPONDING VALUES FOR THE TOP FEMALE GROUP WERE .65 AND 1.94 MINUTES. AGAIN, THE THREE-VARIABLE MODEL WAS ONLY MARGINALLY BETTER IN ITS PREDICTIVE POWER. IT WAS CONCLUDED (IN THIS CASE) THAT ROAD RACE PERFORMANCE CAN BE PREDICTED WITH REASONABLE ACCURACY AND THAT ACCURACY IS ENHANCED WHEN THE DATA ARE DERIVED FROM A POOL OF HIGH LEVEL RUNNERS, ESPECIALLY WHEN THEY ARE MALE.

NOTES AND COMMENTS

THE EFFECTS OF PHYSICAL TRAINING ON THE IRON STATUS OF WOMEN ATHLETES

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Ten highly trained athletes, members of an intercollegiate womens' indoor/outdoor track team, and ten untrained controls participated in a study designed to examine the effect of physical training on the iron status of women rummers. The following variables were repeatedly measured over a six month time span: hemoglobin, hematocrit, serum iron, total iron binding capacity, serum albumin and percent saturation. The following dietary parameters were measured: energy, protein, vitamin C, dietary iron, supplemental iron and absorable iron. The control group had significantly lower ($p \leq 0.05$) energy, dietary iron and protein intakes than the experimental group and both groups had iron intakes below the recommended dietary intake of 18 mg/day. The athletes' iron consumption did not change significantly throughout their competitive season. There were no significant correlations between dietary iron or absorbable iron intake and those indices of iron status measured. There were no significant differences in the concentrations of hemoglobin, hematocrit, serum iron and percent saturation of the athletes over time or between the athletes and the controls. There was however, a significant upward trend ($p \leq 0.05$) in the athletes' TIBC and serum albumin concentrations during their competitive season. The results of this research support previous research indicating that women athletes may be at a particular risk for iron deficiency anemia.

NOTES AND COMMENTS

CINEMATOGRAPHICAL ANALYSIS OF ONE-HANDED VERSUS TWO-HANDED METHODS OF CATCHING AS THEY AFFECT THE BASEBALL THROW TO SECOND BASE

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The purpose of this study was to compare the biomechanical variables of the one-handed and two-handed methods of catching and how they affect the throw to second base. Four subjects, all active catchers, were filmed in the sagittal plane using a high speed (180 fps) Locam camera. All subjects performed each method alternately; a total of three trials apiece were attempted. Nine anatomical points were taken from the film, cyclogramed and digitized. The data were then used in two computer programs written by the author for kinematic and torque calculations. For the subjects studied, two main conclusions were made: using the one-handed method, a greater release speed of the ball was obtained; using two-handed method, a faster release time was obtained.

NOTES AND COMMENTS

TRAINABILITY OF WOMEN ALREADY AT AN ABOVE AVERAGE FITNESS LEVEL

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It has been observed that the higher the initial level of fitness, the smaller the percent change in fitness following a training program. The purpose of this study was to examine changes in cardiorespiratory fitness and body composition in response to an increase in training in initially fit females. Each subject met the following criteria: $\dot{V}O_2max$ > 38 ml/kg·min and running 10-20 miles/week for at least six months prior to the study. Before and after the training period $\dot{V}O_2max$ and work time to exhaustion were measured utilizing a graded treadmill protocol and body composition was assessed via skinfolds. The Ss were divided into two groups: (a) control group (C) (n=5) which was instructed to maintain 10-20 miles/week; and (b) experimental group (E) (n=7) which gradually increased mileage to 45 miles/week. Results were as follows:

		E		C	
		Pre	Post	Pre	Post
$\dot{V}O_2max$ (ml/kg/min)	$\bar{X}$	50.5	52.9	48.2	45.6
	SD	3.8	2.8	4.1	5.5
work time (min)	$\bar{X}$	13.3	14.4	12.8	11.7
	SD	1.2	1.1	2.6	2.3
% body fat	$\bar{X}$	19.9	18.3	17.6	19.5
	SD	3.7	1.9	2.2	2.6

The decreases in $\dot{V}O_2max$ and work time observed in C were explained by a significant reduction in average weekly mileage. In E a significant increase ($P < .05$) in $\dot{V}O_2max$ (ml/kg·min) occurred; however this level of significance was not found when $\dot{V}O_2max$ was expressed as l/min (p=.06). Also in E there was observed a minimal but nonsignificant decrease in % body fat. Therefore these results suggest that the significant increase in weight relative $\dot{V}O_2max$ (ml/kg·min) could be related to the combined effects of a moderate increase in cardiorespiratory fitness (l/min) and moderate decrease in % body fat.

NOTES AND COMMENTS

BODY WEIGHT AND FOOD INTAKE IN THE GENETICALLY OBESE ZUCKER RATS FOLLOWING A TWO-HOUR A DAY EXERCISE TRAINING PROGRAM

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Present data suggest that female rats do not differ in body weight following one hour per day treadmill training. However, the influence of treadmill running on body weight in obese rats is not well defined. Therefore, the purpose of this study was to investigate the influence of an eight week treadmill running program two hours per day five days per week on body weight and food intake in lean and obese Zucker rats. The animals were eight weeks of age at the time training was initiated. Data were analyzed by ANOVA in a complete randomized design with a split plot (repeated measures) arrangement of treatments. Post hoc tests indicated that at eight weeks of age, differences existed between lean and obese rats' body weights, but that no differences existed between sedentary (123 gm $\pm$ 12) and trained (126 $\pm$ 16) obese rats. After three weeks of training, differences did exist between obese sedentary and trained rats. These differences persisted until the end of the eight week training period when the mean body weight of the sedentary animals was 393 gm $\pm$ 31 and the mean for the trained animals was 371 gm $\pm$ 22. No differences were found to exist between the lean sedentary (218 gm $\pm$ 12) and trained (217 gm $\pm$ 20) rats after the training period. A difference in food intake was also found between lean and obese rats before exercise training started, but no difference existed between sedentary (11.7 gm $\pm$ 1.2) and trained (11.5 gm $\pm$ 0.8) lean rats or sedentary (17.7 gm $\pm$ 1.5) and trained (19.4 gm $\pm$ 2.8) obese rats. After seven weeks of training a difference did exist between sedentary (37.6 gm $\pm$ 2.5) and trained (33.4 gm $\pm$ 8.6) obese rats. These differences continued to exist through the last week of training. No differences in food intake were observed in lean rats. Data from this study indicates that body weight can be reduced in the obese rat by physical activity requiring about 70% maximal aerobic capacity, and to a lesser extent food intake can also be reduced in the obese rat. This animal model may provide insight into mechanisms for alterations of obesity in response to exercise training.

NOTES AND COMMENTS

EFFECT OF TOE CLIPS DURING BICYCLE ERGOMETRY ON MAXIMAL OXYGEN UPTAKE

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The purpose of this study was to test the hypothesis that the use of toe clips during bicycle ergometer testing results in a higher maximal oxygen uptake ($\dot{V}O_2max$) due to involvement of greater muscle mass than testing without toe clips. Eight men ($\bar{X}$ age = 25), four competitive cyclists and four competitive distance runners, completed three maximal exercise tests. Two of the tests were on a Monarch bicycle ergometer; one test was with standard toe clips and dropped handle bars and the second was without toe clips. The third test was on a Quinton treadmill using a running protocol. The test protocols were continuous, graded, and standardized for all subjects. The order of the tests was randomized for each subject with at least 48 hours between any two tests. Oxygen uptake was measured every minute of the test using a semi-automated gas collection system. $\dot{V}O_2max$ values and performance times with toe clips were on the average significantly ($p<.05$) higher (62.4 ml & 12.2 min) than without toe clips (60.4 ml & 11.2 min). Mean maximal HR and R values for the two conditions were 182 and 184 b/min, and 1.12 and 1.11, respectively. As expected, mean treadmill $\dot{V}O_2max$ values were significantly higher (66.9 ml) than those from the bicycle ergometer tests as was the mean maximal HR (189 b/min). Within the subgroups of cyclists and runners, the above-mentioned trends were all evident although the magnitude of differences varied. The research hypothesis was supported with a higher mean $\dot{V}O_2max$ (2 ml) and performance time (1.0 min) being achieved with the use of toe clips. It remains to be seen whether the magnitude of this difference is of important practical significance for training and/or competition.

NOTES AND COMMENTS

PHYSIOLOGICAL RESPONSES TO THE P02 AEROBIC EXERCISER IN AN ELITE MARATHONER

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To evaluate the PO_2 Aerobic Exerciser (InspirAir Corporation, Westlake Village, CA) as a training aid, selected physiological variables were measured in a 30 year old, nationally-ranked male marathoner. To examine acute effects, the S's heart rate (HR) was recorded during treadmill running under three conditions: with the PO_2 Aerobic Exerciser (AE), with a modified Aerobic Exerciser (MAE) in which there was no rebreathing of expired air, and a control (C) in which the Aerobic Exerciser was not worn. The treadmill protocol was continuous and speed incremented; following an initial warm-up, the S ran for 4 min at each of three speeds (pace), 188 m/min (8:30 min/mi), 215 m/min (7:30 min/mi), and 241 m/min (6:40 min/mi). The protocol was repeated for each of the three conditions with enough rest between for the S's HR to decrease to 80 b/min. This format was followed three times over a 10-day period with the order of the conditions rotated. Average HRs for the AE condition were 13 to 15 b/min higher than for the C (at 188 m/min, 123 vs 110 b/min; 215 m/min, 134 vs 121 b/min; 241 m/min, 145 vs 130 b/min), while for the MAE condition, average HRs were 4 to 5 b/min higher than the C. Thus, about one-third of the average rise in HR could be attributed to just carrying the Aerobic Exerciser without any rebreathing (MAE). Using the Aerobic Exerciser per manufacturer's instructions (AE) resulted in a 7% increase in % HRmax at each speed (at 188 m/min, 58 to 65%, 215 m/min, 64 to 71%; 241 m/min, 69 to 76%). A second part of this study monitored Hb and Hct values over a 4-month period in which the Aerobic Exerciser was used in training an average of 3 times/wk for 45 to 60 min/session. Measures at 1 month (15.2 g/dl & 43.3%) and 4 months (14.9 g/dl & 42.0%) indicated no changes from the S's well-established normal values of 15.1 ± 0.5 g/dl and 43.6 ± 1.8% ($\bar{x}$ ± SD based on 15 measures collected over the previous year). In using the Aerobic Exerciser on a regular basis, the S felt the instructions for replacing the chemicals were inadequate and experienced repeated problems, particularly prolonged headaches following use. The Aerobic Exerciser definitely increases the intensity of training at a given pace. A portion of this effect is due to the weight of the apparatus (5 lb) with presumably the primary effect due to it's rebreathing operation. In contrast to the manufacturer's claims, no change in Hb or Hct were documented in the S.

NOTES AND COMMENTS

PERCENT BODY FAT IN FEMALE ATHLETES

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Previous research has indicated that body composition regression equations derived from anthrometric variables are populasion specific and there seems to be a lack of information on female athletes or females with below average body fats. The need for a better regression equasion was demonstrated by the use of the Jackson et al Sloan and Weir equasion with this population. These equasions yielded r values equal to .62 and .58 respectively. The purpose of this study was to derive a regression equation specifically for use with female athletes. Hydrostatic weighing was used to determine percent body fat. The regression equation was developed from the sum of skinfolds at seven different sites (triceps, subcapular, abdomen, thigh, suprarlium chest, and axilla). The study was conducted on 44 members of the Florida State University basketball, track, swimming, and softball teams. The mean age of the subjects was 19.68 $\pm$ 4.47, body fat by hydrostatic weighing was 19.12 $\pm$ 4.21, and sum of seven skinfolds was 72.98 $\pm$ 17.70. The multiple R for the sum of seven skinfolds was .68. ANCOVA was used to determine if there was a significant difference in the percent body fat between the four teams measured controlling for the sum of seven skinfolds. No significant differences between teams were found.

NOTES AND COMMENTS

PHYSICAL PERFORMANCE TASKS REQUIRED OF U.S. MARINES OPERATING IN A HIGH ALTITUDE COLD WEATHER ENVIRONMENT

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The purpose of this investigation was to gather information regarding physical performance tasks required of U. S. Marines operating in a high altitude/cold weather (HA/CW) combat environment. Ten researchers were integrated into a marine battalion during a HA/CW combat training operation at the Mountain Warfare Training Center located at Pickel Meadows, Ca.. Field operations were conducted at altitudes of 7,000 to 10,000 feet, with temperatures ranging from -30 degrees C to 0 degrees C. Initial physiological assessments were conducted at the Naval Health Research Center in San Diego. Each member of the research team observed two subjects for 36 hours each during the three days of war games. Variations in weight of clothing and equipment worn, speed of movement, percent grade being ascended or descended, distances covered, external loads carried, and types of terrains being traversed were recorded using minicassette recorders, inclinometers and cameras. The predictive model of Givoni and Goldman was used to estimate the energy costs associated with movement under these conditions. The ability to sustain prolonged marches while encumbered with heavy, restrictive clothing and equipment totaling at times more than 70% of one's body weight through new fallen snow, up inclines of 15 degrees was judged as the most critical task observed under these conditions.

*Supported by Naval Medical Research and Development Command Contract #N0014-80-C-0473 obtained by the Institute of Human Performance, Langley Park, Md.

NOTES AND COMMENTS

BLOOD LACTATE CONCENTRATIONS DURING SUBMAXIMAL WORK UNDER DIFFERING ENVIRONMENTAL CONDITIONS

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The literature regarding blood lactate (HLa) levels during prolonged submaximal exercise in the heat is equivocal with some investigators reporting that blood HLa decreases, increases or remains unchanged when compared to the same level of work in a neutral environment. In an effort to ascertain the effects of heat stress on the blood HLa response to prolonged exercise, 10 trained men were studied under two thermal conditions during 45 minutes of cycle exercise ($\sim$60% $\dot{V}O_2$ max). On one testing day the subject was heat stressed during exercise by wearing a nylon pull-over shell (heat stress treatment) and pants, while on the second day fans were directed on the subject exercising in a thermoneutral environment (control experiment). The heat stress experiment produced higher ($P < 0.05$) rectal temperatures and mean skin temperatures when compared to the control experiment. Blood HLa levels were greater ($P < 0.05$) across time during exercise in the heat stress experiment when compared to work in the control experiment. Thus, these data support the observation that blood HLa concentrations are higher during moderate submaximal exercise in the heat when compared to the same exercise load in a thermoneutral environment. Further, it is hypothesized that this rise in blood HLa during exercise in the heat is due to reduced hepatic removal of HLa and/or increased production of HLa due to an elevated $\dot{V}O_2$.

NOTES AND COMMENTS

RELATIONSHIP OF CARBOXYHEMOGLOBIN TO OXYGEN SATURATION AS DETERMINED BY MULTIPLE WAVE LENGTH SPECTROPHOTOMETRY DURING REST AND EXERCISE

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This study evaluated the effects of carboxyhemoglobin on arterial oxygen saturation as determined by multiple wave length spectrophotometry (Ear Oximetry) during rest and exercise. Eleven subjects with varying degrees of chronic obstructive pulmonary disease (COPD) were studied. Subjects were continuously monitored by ECG and Ear Oximetry. Prior to testing an intravenous catheter (18.5G) was placed in the radial artery with a 3 way stopcock and flushed with Heparin Sodium. Samples were obtained at rest and during the last 15 seconds of each stage of exercise and correlated to Sao_2 levels as measured by the Ear Oximeter. Results indicate that a significant difference ($p < .05$) exist between Sao_2's obtained by measurement of whole blood and Ear Oximetry. In an effort to correct for the differences noted, a family of structural equation models has been developed to obtain confidence intervals for arterial oxygen saturation from ear oximetry and resting carboxyhemoglobin values. These data indicate that absolute Sao_2 levels can be accurately predicted in the presence of varying amounts of carboxyhemoglobin by Ear Oximetry both at rest and during exercise

NOTES AND COMMENTS

ACUTE EFFECTS OF AN EXTENSIVE STATIC STRETCHING PROTOCOL ON GROSS MOTOR PERFORMANCE

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This study observed the acute effects of a static stretching regimen on the gross motor performance of adult male athletes. Fourteen Ss, all varsity college tennis or baseball players, completed a motor performance test battery on two separate days. The battery included agility run, vertical jump and 200 yard shuttle run tests. On one day Ss performed a 30 minute static stretching protocol immediately prior to taking the three tests. On the other day Ss rested quietly for the 30 minutes preceding the tests. The orders of both the treatments and the tests were randomized. Flexibility of the low back/hamstring region was measured using the Wells Sit and Reach Test prior to and following the stretching or control treatment and after completion of the motor performance battery. Flexibility was significantly increased by the stretching protocol ($p < .01$) and this effect was maintained after completion of the test battery. No significant changes in flexibility were observed with the control treatment. ANOVA was employed to compare the two treatment means for five dependent variables: agility trial 1, agility trial 2, best agility (trial 1 or 2), vertical jump and shuttle run. Means for all variables favored the stretching treatment, however, only for agility trial 1 did the effect attain statistical significance ($p < .05$). These results suggest that an extensive static stretching protocol has, at most, a very modest impact on gross motor performance.

NOTES AND COMMENTS

COMPARATIVE EVALUATION OF AEROBIC DANCE AND JOGGING PROGRAMS

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Aerobic dance has become one of the most popular modes of physical activity used for the purpose of enhancing health related physical fitness. However, the physiological effects of an aerobic dance program have not been clearly established. This study observed the effects of an aerobic dance course on the cardiorespiratory fitness and body composition of college women and compared these effects with those of a jogging course. The sample consisted of 37 female volunteers from an introductory jogging class (n=17) and a first level aerobic dance class (n=20). Pre and post treatment evaluations of cardiorespiratory fitness (Ashand-Rhyming test) and body composition (skinfolds) were performed. Both groups of subjects completed a 12 week course which involved 20-25 minutes of actual activity twice per week and were encouraged to participate on their own a third day. A split plot with a repeated measures format was employed to determine the between and within group differences for both estimated $\dot{V}O_2max$ and percent fat scores. Post hoc tests (LSD) were used to test specific hypotheses. Analyses showed that there were no significant differences between the groups in either their pre or post treatment mean percent fat (dancers % fat pre = 21.0 $\pm$ 2.8, post = 19.4 $\pm$ 2.2; joggers % fat pre = 19.9 $\pm$ 3.9, post = 18.2 $\pm$ 3.8). However, there was a significant change in percent fat from pre to post treatment for both groups. The comparisons of $\dot{V}O_2max$ showed that the pre treatment scores were not significantly different (dancers pre $\dot{V}O_2max$ = 33.5 $\pm$ 6.5 ml/kg·min, joggers pre $\dot{V}O_2max$ = 32.4 $\pm$ 8.3 ml/min·kg). However, the jogging group ($\dot{V}O_2max$ = 39.5 $\pm$ 7.4 ml/min·kg) had a significant increase ($p < .01$) and the dancers ($\dot{V}O_2max$ = 34.5 $\pm$ 5.6 ml/min·kg) failed to have a significant improvement. These results suggest that a typical aerobic dance or jogging program increases caloric expenditure and thus significantly reduces percent body fat. Contrary to expectations, only the jogging program positively influenced cardiorespiratory fitness. The data seem to indicate that jogging is preferred over aerobic dance as a means of enhancing cardiorespiratory fitness.

NOTES AND COMMENTS

EFFECTS OF RACE AND GENDER ON EXERCISE TOLERANCE

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Investigators are normally careful about calibration of equipment, measurement of physiological variables, and timing of the test stages; however, the testing environment is less controlled. This is the third in a series of studies to determine the effects of environmental factors on responses to an exercise tolerance test. Volunteer black male (BMS, n=2Ø) and female (BFS, n=2Ø) and white male (WMS, n=2Ø) and female (WFS, n=2Ø) college students, were tested on a graded treadmill test. Heart rate (HR) and rating of perceived exertion (RPE) were measured prior to, during each stage and post-exercise. Four testers (T) (black female--BFT, white female--WFT, black male--BMT, white male--WMT) tested five subjects of each race and gender. Differences ($p<.1Ø$) based on race and gender of testers and race and gender of subjects were determined by a 2X2X2X2 ANOVA. There were no differences on maximal HR. Females had higher HR in all other conditions. There were no differences for S race or T race or gender for the exercise HR's. However, there were four-way interactions on sitting and standing HR prior to exercise. BFS had similar response to all Ts; BMS had a lower HR with WT sitting and to a lesser extent standing. WMS had a lower sitting and standing HR with the BFT, and WFS had a greater HR with the WMT. Females had a higher RPE on the submaximal stages. BFS had a greater RPE with WT on stage 1. All Ss had a greater RPE with BT on stage 2. Max RPE was higher for WS in general, but BMS had a lower RPE than BFS, while WMS had a higher RPE than WFS. During the recovery exercise stage, BFS were lower with WT, BMS were not affected by the T; WMS had a higher RPE with BT, while WFS had lower RPE with BT. In terms of total time to voluntary exhaustion, the longer times were found with the following: males; BMS and WFS with FT; and BFS with MT. In general, males tended to do better than females. There were interactions between the type of T and type of S for most variables except for HR during exercise.

NOTES AND COMMENTS

THE OCCURRENCE AND SIGNIFICANCE OF DIASTOLIC BLOOD PRESSURE ELEVATION DURING GRADED EXERCISE IN APPARENTLY HEALTHY ADULTS

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Graded exercise test (GXT) records (n=192) from the Cardiac & Intervention Center at Virginia Tech were screened to identify occurrences of exertional hypertension (EH) in individuals without documented coronary heart disease. A hypertensive response to exercise was defined as a rise in fourth-phase diastolic blood pressure (DBP) $\geq$ 10 mmHg from the standing pre-GXT values. Those participants exhibiting EH who were normotensive (BP $\leq$ 140/90 mmHg) and without antihypertensive medications were included in the sample (n = 26). Individuals who met the criterion for EH represented 17% of all females (n = 53) and 12% of all males (n = 139) who were medically referred to participate in a health-promotion physical fitness program between 1977-82. The EH subjects were then dicotomized according to the degree of exertional hypertension evidenced: mild-moderate EH = DBP rise of 10-19 mmHg (MEH) and moderate-severe EH = DBP rise $\geq$ 20 mmHg (SEH). Descriptive statistics ($\bar{x}$) for parameters pertinent to the coronary disease risk of the MEH and SEH groups are:

	Age (yr)	Sex (M:F)	Pred Fat (%)	Exer Cap (METS)	Rest Stdg BP (mmHg)	Serum Chol (mg/dl)	Smoking Freq (% Ss)
MEH	44.2	10:3	21.0	9.1	126/78	228	23
SEH	44.9	7:6	23.5	8.8	123/74	202	15

Standing resting and peak exercise systolic/diastolic BP values ($\bar{x} \pm$ SD) in the MEH group were 126 $\pm$ 8/78 $\pm$ 8 and 178 $\pm$ 20/91 $\pm$ 8 mmHg. In SEH the corresponding values were 123 $\pm$ 11/74 $\pm$ 9 and 186 $\pm$ 27/102 $\pm$ 9. Four of the SEH had DBP rises in excess of 30 mmHg (3 males: 1 female) and two males showed DBP rises beyond 40 mmHg. In none of these subjects did evidence of myocardial ischemia, or unusual signs/symptoms become manifested to suggest cardiovascular dysfunction associated with EH. Use of an absolute GXT termination criterion for rising DBP of 20 mmHg may be unwarranted in physician supervised tests of apparently healthy subjects with no evidence of evolving exercise-induced cardiovascular dysfunction. In order to maximize the diagnostic potential of a GXT without compromising subject safety, an absolute ceiling for DBP, i.e., 110-120 mmHg might be considered as a more appropriate endpoint determinant. It appears that in normotensive individuals EH may be more prevalent in females than in males.

NOTES AND COMMENTS

EFFICACY OF THE ANAEROBIC THRESHOLD vs KARVONEN METHODS FOR DETERMINING AN OPTIMAL STIMULUS FOR AEROBIC CONDITIONING IN YOUNG ADULT MALES

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Comparisons were made of two approaches to setting the intensity component for exercise prescription with an aim toward optimizing the aerobic training stimulus. Ten physically active males, 22-26 yr, with a predicted body fat content of 14 ± 2.5 % ($\bar{X}$ ± SD) and $\dot{V}O_2$max of 59.6±5.6 ml·kg^{-1}·min^{-1} were given small incremented treadmill tests (GXT) with an initial stage of 4 METS and subsequent stages increased by 0.33 METS each 20 s until exhaustion was expressed. Using conventional apparatus and procedures for collecting cardiovascular, respiratory-metabolic and perceptual responses in GXTs, heart rate, blood pressure, $\dot{V}_E$, $\dot{V}O_2$, R, and RPE were taken at frequent intervals which corresponded with the stage changes. From heart rates taken at the $\dot{V}O_2$max and in a supine pre-exercise posture, the heart rate reserve for each subject was determined and served as a basis for computing a prescriptive level for training at 70% of the heart rate reserve (Karvonen Method: K_m). Using polynomial regression analyses, the GXT intensity corresponding to an alinear rise in $\dot{V}_E$ was objectively determined for each subject and accepted as the predicted anaerobic threshold (AT). AT in these subjects was 65.3 ± 5.8 % of $\dot{V}O_2$max and the heart rate elicited at this level was used in the second method for setting the prescriptive training intensity (AT_m). Subjects then ran on a treadmill at predetermined speeds with 2 % grade in separate trials, once at a level to initially elicit a steady-state heart rate according to K_m and once according to AT_m. Participation in K_m and AT_m was randomly ordered for each subject by an independent observer who subsequently issued prescriptive heart rates before each trial so that neither subject nor investigator knew the method that was in effect for the trial. The duration of each "training simulation" trial was predetermined at 60 min, but was terminated earlier if subjects expressed fatigue or sustained near-maximal heart rates. With the K_m exercise trial subjects exceeded prescriptive heart rate limits, i.e., 75 % of heart rate reserve, at 16.7 ± 17.5 min and terminated exercise at 47.2 ± 13.0 min with a peak heart rate of 179.3 ± 17.3 bt·min^{-1}. With the AT_m trial, the prescriptive heart rate limit was exceeded significantly later ($p < 0.05$) at 29.0 ± 22.1 min, but termination due to fatigue was attained at a time similar to K_m with a significantly lower ($p < 0.05$) peak heart rate of 174.0 ± 17.0 bt·min^{-1}. The AT_m may enhance the determination of an optimal stimulus level for aerobic conditioning in active young men.

NOTES AND COMMENTS

ENDPOINT FOR THE CLINICAL EXERCISE TEST: AN ALTERNATIVE TO USING PERCENTAGES OF PREDICTED HRmax?

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The aim of this study was to determine whether detection of an exercise-induced ischemic ECG response could be enhanced via a criterion that the ventilatory indicator of anaerobic threshold (alinear increase in V_E:AT) be exceeded before test termination. So that reference could be made to the conventional method for establishing a diagnostic endpoint, percentages of the age-adjusted predicted maximal heart rate (%HRmax) were also calculated for the GXT stage one level below (AT_{BL}) and one level above (AT_{AB}) that at which alinear ventilation was discerned. For each patient, ST_{DEV} (ST depression/elevation at 0.08 s beyond the J point) was averaged for two ECG complexes at AT_{BL} and AT_{AB} and an ST_{DEV} of 0.2 mV was accepted as the diagnostic standard for a positive response. Records from symptom-limited GXTs for five ischemic heart disease patients were selected in which an evolving positive ECG response occurred. Each attained at least four - five 2 min treadmill stages and none were taking medications that might affect heart rates or ECG expression of ischemia. Test protocols, monitoring procedures, and termination criteria were conducted in accordance with established ACSM guidelines; respiratory-metabolic parameters were measured at even minutes using conventional apparatus and the open-circuit method. The results were:

GXT STAGE	ST_{DEV} (mV)	CASES of 0.2 mV ST_{DEV}	PREDICTED HRmax (%)
AT_{BL}	.084* ± .059	0/5	73 ± 9
AT_{AB}	.222* ± .109	2/5	94 ± 5

Values represent $\bar{x}$ ± SD. *difference significant @ $p < 0.10$

Thus, nearly a three-fold greater ST_{DEV} occurred as a function of extending the exercise tests to an intensity one level above the AT. These data suggest that the frequency of detecting ischemic ECG responses may be enhanced if post-test review of ventilatory data indicates a performance beyond the AT. Further research should be done to determine if this method might reduce the incidence of false-negative results in diagnostic GXTs that otherwise would be terminated upon attainment of predetermined predicted heart rate endpoints.

NOTES AND COMMENTS

ALTERATIONS IN PROTEIN METABOLISM, INSULIN, AND CORTISOL AS A RESULT OF RESISTANCE EXERCISE AND ORAL GLUCOSE INGESTION

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Six male subjects (20-31 years old) were employed to investigate the effects of acute resistance exercise on protein metabolism, insulin and cortisol levels, and their interrelationships during exercise. Each subject undertook two standardized 1 hour work bouts on the Nautilus Leg Press machine accompanied by the ingestion of water (C) one time or a glucose solution (G) on the other occasion. Serum glucose, urea N, insulin, and cortisol were determined pre-, mid-, post-, 60 min post-, and 120 min post-exercise. Urine urea N excretion rate was determined 15 min pre-, 30 min post-, and 120 min post-exercise and sweat urea N excretion was evaluated. Serum glucose, insulin, and cortisol were not significantly affected during the C bout while cortisol exhibited marked decreases during the recovery period. The G bout resulted in significantly elevated serum glucose and insulin levels relative to C while the response of cortisol was undifferentiated. Under both C and G conditions serum urea N was not significantly altered and urine urea N excretion rates tended to exhibit identical transient non-significant reductions post-exercise. Sweat urea N excretion increased markedly over rest during both bouts, the increase tending to be less pronounced under the G condition. The observed lack of an insulin depression during exercise is unusual. Such a metabolic response implies a similarity of resistance type exercise to anaerobic dynamic type exercise and also suggests a greater relative contribution of blood glucose as an energy substrate. The effect of exercise on serum cortisol responses appears to have been superimposed on and overshadowed by the depressing influence of the diurnal rhythm. Urea N parameters indicate that compensatory changes in urea N excretory mechanisms take place as a result of resistance exercise but that no alterations in net urea N excretion or production, and hence in protein catabolism, are occurring. The tendency for sweat urea N excretion to have been lower under the G treatment suggests the possibility that changes in insulin levels may be able to modify protein metabolism during exercise.

NOTES AND COMMENTS

EFFECTS OF A CARDIAC REHABILITATION PROGRAM ON BLOOD LIPIDS AND BODY COMPOSITION

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The purpose of this investigation was to retrospectively determine the effects of an eight week program of rehabilitation on the blood lipids and body composititon of cardiac patients. The rehabilitation program consisted of two major components, exercise and diet counseling. The exercise program consisted of three sessions per week, approximately 30 minutes in duration, utilizing a 75% Karvonen target heart rate, based on a treadmill test to approximately 70% of age adjusted maximal heart rate. A dietician supervised diet therapy. The records of 132 consecutive patients (118 males and 14 females) were analyzed. Mean age was 54.6± 6.7 years. Fasting blood samples were analyzed for total cholesterol(tCHOL), high density lipoprotein cholesterol(HDL), glucose(GLU) and triglycerides(TRIG). Low density lipoprotein cholesterol(LDL) was estimated in the usual manner. Body fatness was estimated with skin calipers at four sites. The means, ± the S.E. are as follows.(* denotes significance - p 0.05)

	PRE	POST	
mass (kg)	81.7 ± 1.3	80.4 ± 1.3	*
skinfold(mm)	73.3 ± 2.9	69.6 ± 2.4	*
% body fat	30.8 ± 0.7	29.9 ± 0.6	*
tCHOL(mg/dl)	218.9 ± 3.9	211.0 ± 3.0	ns
HDL(mg/dl)	37.9 ± 0.9	39.1 ± 0.9	ns
LDL(mg/dl)	139.0 ± 3.2	137.4 ± 3.0	ns
TRIG(mg/dl)	224.4 ± 18.4	190.9 ± 15.8	*
GLU(mg/dl)	102.5 ± 2.4	101.8 ± 2.5	ns
HDL/tCHOL	.179 ± 0.05	.191 ± 0.05	*
LDL/tCHOL	.654 ± 0.08	.641 ± 0.07	ns

CONCLUSIONS: These results show that relatively modest exercise and diet changes can favorably influence the body composition, TRIG and HDL/tCHOL ratio. The lack of change in tCHOL, HDL and LDL may be the result of insufficient intensity and/or duration of treatment.

NOTES AND COMMENTS

THE EFFECTS OF AN INTENSE WEIGHT CONTROL INTERVENTION PROGRAM ON OBESE CHILDREN: INITIAL AND FOLLOWUP

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Obesity is a serious health problem which, for many individuals, is related to childhood problems of weight control. Behavioral intervention programs have demonstrated some success when used with adult and childhood populations; followup, however, is rarely reported. The purpose of this study was to examine the effects of an intense five-week program of behavioral management, nutrition education and physical activity on the body composition of obese children and to assess program effects after a four month followup period. Children (n=17) enrolled in a summer weight control intervention program served as subjects. Body composition measures (height, weight, skinfold, and body density) were taken immediately before and after the five week program. Following a four month period, followup measures were obtained from eight participants. Results were as follows:

	Post Intervention (n=17)		Short and Long Term Followup (n=8)			
			(T_1-T_3)		(T_2-T_3)	
	$\bar{x}$	sd	$\bar{x}$	sd	$\bar{x}$	sd
Weight (kg)	-1.53*	1.78	.17	3.90	1.90*	3.13
WLI[a]	-6.00*	5.39	-8.95*	4.87	-2.45	3.13
Underwater Weight (kg)	.41*	.33	.37*	.17	.02	.22
Body Density (g/cc)	.004	.02	.02*	.03	.01	.03

[a] Weight for Length Index * $p < .0001$

Paired t-tests found significant differences between pre and post test measures in weight, WLI, and underwater weight. Followup assessment showed a significant weight change after the program, but not when total weight loss was considered. WLI continued to decrease indicating weight changes due to changes in height. Step-wise regression found weight loss to be the primary predictor of success in followup while increases in aerobic capacity were found to be primary predictors of long term success.

NOTES AND COMMENTS

ACUTE EFFECTS OF EXERCISE ON SERUM LIPID FRACTIONS IN UNTRAINED FEMALES

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The intent of this study was to examine the acute effects of exercise, at 70% of maximal oxygen consumption (70% VO_2max), on serum lipid fractions in untrained women. Eight untrained females performed a 45 minute bicycle ergometer ride at 70% VO_2max. 12 hour fasting blood samples were drawn prior to submax performance (T1), immediately after (T2), and on the first day (T3), second day (T4) and fourth day (T5) post exercise. Blood samples were assayed for total cholesterol (TCHOL), HDL cholesterol (HDL-C) and triglycerides (TG), while LDL cholesterol (LDL-C) was estimated. Results of ANOVA for repeated measures are as follows:

		T1	T2	T3	T4	T5
Triglycerides (mg%)	$\bar{X}$	83.6	80.0	77.6	69.0	80.9
	SD	33.0	30.3	27.5	30.5	35.6
HDL Cholesterol (mg/dl)	$\bar{X}$	53.4	54.9	47.7	47.1	45.4
	SD	8.1	15.2	11.0	10.9	8.9

Results show significant decreases in TG beginning at T2, and continuing until T5. These trends are similar in acute exercise studies in men. However, HDL-C also decreased significantly at T2 and remained below initial levels at T5. Similar studies involving untrained men showed no change in HDL-C following an acute bout of exercise.

TCHOL, HDL-C and LDL-C were significantly correlated to subjects' stage in menstrual cycle, indicating a greater degree of control is needed in studies involving women.

Hydrolysis of TG, catalyzed by lipoprotein lipase (LPL), into VLDL and chylomicrons is seen during endurance activity, when fat metabolism is the primary source of energy. It has been shown that precursors of HDL are formed from lipolysis of TG-rich lipoproteins by LPL. In this study of untrained females HDL decreased on days following exercise. The exercise bout may have been at too high intensity to be utilizing primarily fat metabolism. Further research is needed to better characterize these mechanisms.

NOTES AND COMMENTS

A PHYSIOLOGICAL PROFILE OF PROFESSIONAL BASEBALL PLAYERS

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The purpose of the study was to determine the physical condition of professional baseball players on selected fitness variables when reporting to spring training. Forty-three professional players were measured for body composition, leg strength, and flexibility and were grouped according to team position of infield, outfield, pitcher, or catcher. In addition, leg strength was analyzed for right quad/left quad ratios, quad/body weight ratios, right ham/left ham ratios, and ham/body weight ratios.

The body composition data revealed that catchers had the highest percent of body fat (17.2%) followed by pitchers (14.7%), infielders (13.5%), and outfielders (12.9%). The highest individual percentage of fat was 26.1%, and the lowest was 6%. Cybex strength data revealed that outfielders had the strongest quadriceps when expressed as a function of body weight (ft.lbs./body weight) with a ratio of 1.08 (RQ/b.wt.) and 1.06 (LQ/b.wt.) followed by infielders (1.04 and 1.06), pitchers (.96 and 1.02) and catchers (.90 and .92) respectively. Cybex hamstring data revealed the outfielders also to have the highest ratios (one leg strength/body weight) of .71 (right) and .63 (left) followed by pitchers (.65 and .67), infielders (.63 and .63) and catchers (.56 and .60) respectively.

Catchers had the best sit-and-reach flexibility (+4.1 inches beyond the toes) followed by outfielders (+3.5 inches), infielders (+3.25 inches) and pitchers (+2.9 inches). Outfielders had the best shoulder flexibility, followed by catchers, infielders and pitchers.

After thorough examination of the data, one must conclude that the team, regardless of position, is in good physical condition on the parameters measured during pre-season. One must be extremely cautious when interpreting team data because the range and standard deviations are large, indicating a large spread of scores. Therefore, all data must be viewed with the individual's weaknesses in mind. In summary, team data should be used only as a general evaluation of team variables and certainly individual data should be reviewed carefully and used for prescriptive suggestions for improvement for all individuals.

NOTES AND COMMENTS

A PHYSIOLOGICAL PROFILE OF PROFESSIONAL BASKETBALL PLAYERS

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Fourteen professional basketball players were assessed for upper and lower body strength prior to reporting to training camp. All strength data was reported as a function of body weight for individualized interpretative purposes on the following strength measures: right quadricep, left quadricep, right hamstring, left hamstring, bench press, "lat" pull, and two arm curl. Additional descriptive statistics included percent body fat, the Astrand cycle test for predicted VO_2, and five measures of flexibility. The mean team body weight was 211.1 pounds and the mean percent body fat was 10.4% (N=11). All Cybex leg strength measures were recorded in foot-pounds of work and then divided by body weight to obtain a better indicator of each individual's relative strength. The team's right quad/body weight yielded a value of .87 and the left quad/body weight ratio also yielded a .87 ratio. These values indicate definite quadricep strength weaknesses in some of the individual team members. Hamstring values were in the acceptable range with team averages of RH/BW = .67 and LH/BW = .66. Team means for bench press, lat pull and two arm curl divided by body weight were .88, .85, and .48 respectively.

The Astrand cycle test yielded a team mean VO_2 of 44.2 ml/kg (N=12) with a wide range of cardio-respiratory condition (Range = 34.3 to 63.4). The flexibility measures were consistent with that of other athletes: sit and reach (+3.8 in.), trunk extension (+15.0 in.), and shoulder elevation (+14.8 in.)

In conclusion professional basketball athletes provide a wide range of data in the parameters of strength, flexibility and cardiorespiratory conditions and each athlete must be evaluated individually and by position played.

NOTES AND COMMENTS

RESULTS OF STUDIES OF POTENTIAL LIGHT SPECTRUM EFFECTS ON HUMAN PERFORMANCE

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Recent findings suggest that the spectrum of light from florescent lamps may influence human behavior and physiology. To evaluate possible light effects on humans at exercise, we measured exercise performance under two widely different light spectra: the spectrum from one bulb-type (General Electric Croma-50) approximated that of sunlight, while the other (General Electric Delux Warm White) was heavy in the red end of the spectrum. Twenty eight moderately active subjects (14 males:14 females; ages 20-32 yrs) were acclimated for 30 minutes before being tested for reaction times and then brought to maximal effort with a modified Balke treadmill protocol under each light condition. Heart rate and respiratory parameters were measured at rest, submaximum (5% treadmill grade), maximum, and three minutes after test termination. Analysis (2-way ANOVA) indicated expected differences between genders only with no effects attributable to light spectrum. The mean for male VO2 max was 44.8 ml O2/kg min for males vs 38.6 ml O2/kg min for females. Mean maximum heart rate was 197 bpm for males and 194 bpm for females. Mean maximum treadmill slope averaged 24.3% for men and 22% for women. A significant difference in submaximum heart rate was found to be due to presentation order. These results fail to indicate that florescent light type influences either physiological parameters during exercise or physical performance itself.

NOTES AND COMMENTS

PHYSIOLOGICAL RESPONSES TO EXERCISE ON A "REBOUNDER"

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The purpose of the investigation was to determine the effects of running on a "rebounder" on the variables of heart rate and oxygen uptake during the task. Nineteen untrained female subjects at an average age of 29.5 (± 5.1) years were selected to run 10 minutes on a rebounder at a cadence of 160 steps per minute. Descriptive data revealed that the subjects had a mean resting heart rate of 67.2 (± 9.1) beats per minute and a body composition of 21.4% (± 3.8). Telemetered heart rates were recorded and direct measures of VO_2 were obtained on a Beckman metabolic measurement cart during the ten minute task. The data revealed that the mean heart rate during the tenth minute of exercise was 166.7 (± 18.9) beats per minute which was within the 85% target training zone for their age and resting heart rate. Further analysis revealed a tenth minute VO_2 of 23.3 (± 6.7) ml/kg/min. The mean total caloric expenditure during the ten minute task was 63.9 (± 15.0) calories. It is concluded that the "rebounder" can be an exercise medium and can be a sufficient stimulus for raising the heart rate of untrained subjects while running in place as determined by the telemetered heart rates. It is also probable that a semi-trained or trained person will need activity which will involve arm movement and possibly the addition of arm and leg weights to increase the intensity of the task to a training VO_2 workload.

NOTES AND COMMENTS