



Spring 2004

American College of Sports Medicine

## ***ACSM applauds U.S. Food and Drug Administration decision to ban ephedra***

*Encourages critical look at additional supplements and drugs*

(Reprint of an ACSM press release of Jan 22, 2004)

INDIANAPOLIS –The American College of Sports Medicine (ACSM), the world leader in the science and medical aspects of sports and exercise applauds today's announcement of a federal ban of all ephedra products. ACSM has long held that the dangers involved with consuming ephedra and other similar supplements far outweigh any potential benefits. These dangers include increased risk of heart irregularities, disturbances of the central nervous system, exertional heatstroke, and gastrointestinal problems.

"Today's news means an overdue step is being taken toward protecting our nation's athletes and others who unfortunately use this dangerous substance for weight loss or to enhance performance," said ACSM President-elect William O. Roberts, M.D., FACSM. "Tragically, this move comes too late for some, but perhaps we will finally see an end to the promotion and use of this potentially dangerous supplement."

Continuing to educate the public about the adverse health effects of such supplements is especially critical this time of year, as so many individuals are resolving to meet new personal fitness and weight loss goals in the new year. Ephedra and other supplements are often dangerously misused as "shortcuts" to such goals. People who exercise and/or train for competition in sporting events are exposed to risk because ephedra may impair the body's ability to cool itself, thereby increasing the potential for heat-related illness during exercise.

Earlier this year, ACSM called for increased awareness about the dangers of ephedra in the wake of

the death of Baltimore Oriole pitcher Steve Bechler, who's death was attributed primarily to his use of ephedra. ACSM continues to advocate for safe sports participation, free of steroid or other supplement use, and for more appropriate methods of increasing physical fitness or gaining sought after effects such as weight loss or competitive advantages.

ACSM is a member of the Coalition for Anabolic Steroid Precursor and Ephedra Regulation (CASPER), a group that proactively seeks regulation of anabolic steroid precursors as well as ephedra.

"Ephedra is only one of a multitude of products available, legal or illegal, that can endanger the health and well-being of those who take them," said ACSM spokesperson Gary Wadler, M.D., FACSM, pointing out many supplements are now being marketed as "ephedra-free." "These products are particularly dangerous when used by individuals who do not understand their dangers. We must continue to promote awareness of these substances and look critically at any that remain unregulated."

ACSM will continue to be concerned about the availability of the over-the-counter drug ephedrine hydrochloride, which is the active ingredient in ephedra and that can be dangerously "stacked" or combined with other stimulants such as caffeine to enhance their stimulant effects. Wadler adds that sports organizations and governing bodies should continue to critically address the issue of access to the over-the-counter drug ephedrine hydrochloride and attempt to eradicate its abuse by athletes.



## Northwest Region Newsletter

Spring 2004

### NWACSM Mission Statement:

It is the mission of the Northwest Chapter of the American College of Sports Medicine to provide educational opportunities for professional development in exercise science and sports medicine and to be a resource for the general public regarding sports medicine and health and fitness issues.

### Contents

ACSM applauds ... decision to ban ephedra .....	1
President's Message .....	2
<b>Upcoming Events</b>	
ACSM Health & Fitness Summit & Exposition .....	3
ACSM 51st Annual Meeting .....	3
ACSM Certifications .....	5
Continuing education opportunities .....	6
<b>NW Chapter Business and Activities</b>	
A note from the treasurer .....	7
2004 Annual Meeting awards and abstracts.....	8-20
<b>NW News and Views</b>	
Job opportunities .....	20
Summer school opportunities .....	21
News from around the region .....	21
News from National ACSM.....	22-23
<b>Book Reviews</b> .....	24-25
<b>Theses and Dissertations</b> .....	26
<b>2004 NWACSM Chapter Officers</b> .....	27
<b>2004 NWACSM Membership Form</b> .....	28

### Newsletter Submission Deadlines

Issue	Deadline
Summer	July 16, 2004
Winter	Nov. 22, 2004
Spring	March 14, 2005

The ACSM Northwest Region Newsletter is produced by Henriette Heiny, Ph.D., FACSM, Director of the International Institute for Sport and Human Performance, University of Oregon. Members of the ACSM Northwest Region are invited to submit contributions to the newsletter.

NWACSM information can also be seen on the Internet, URL: <<http://northonline.northseattle.edu/nwacsm/>>

## President's Message



**D**id you make it to this year's NWACSM

Annual Conference in Seattle? If not, that is too bad because this year's conference had something for everyone. Certainly, the major highlights for myself were the presentations by legendary researchers Jack Wilmore and Barbara Drinkwater,

the enlightening presentations by Glenn Gaesser and Melinda Manore, as well as the lively panel discussion at the end of Sunday's presentations. I realize that "lively panel discussion" sounds like an oxymoron, but when I see some panel members rolling their eyes when another panel member is speaking, or when several panel members repeatedly counter each others counter arguments, I start to imagine that my dream of a panel discussion resulting in fisticuffs may finally come true! No, no, no, the discussion was not really that tense, but it was great entertainment nonetheless for people who had never been exposed to anything more than class lectures and reading assignments. The conference also had a great display of undergraduate and graduate research presentations, interesting vendor presentations in the lobby, plenty of lunches on Sunday (okay, yes, I had two sack lunches); and who will forget the frequent references to rectal thermometers during student presentations on Sunday?

Despite the overwhelming evidence presented above for attending the conference, many of you may still be asking yourselves, "Why attend the NWACSM Annual Conference?" Clearly, the reasons for attending a professional conference are as varied as the people who attend, but I believe there are three common motivating forces that all attendees share. First, we all have a desire to network with fellow professionals. In a region as broad as the Northwest, the only time that many of us actually see one another is the annual conference. Thus, after a few years, the annual conference starts to seem more like a family reunion than a meeting of familiar strangers.

Continued page 4 — President's Message



## Upcoming Events



### ACSM's Health & Fitness Summit & Exposition

April 14-17, 2004  
Renaissance Orlando  
Resort at SeaWorld

This marks the eighth annual Health & Fitness Summit & Exposition. It will be held at the beautiful Renaissance Orlando Resort at Sea World™. A maximum of 20.25 CECs will be awarded to those who attend the Summit in its entirety.

For details on the meeting content, registration and hotel see <<https://www.acsm.org/meetings/summit.htm>>.

[annualmeeting.htm](#)> for registration information.

### General Annual Meeting Schedule

#### Tuesday, June 1

Noon-8 p.m. ACSM Registration open

#### Wednesday, June 2

6-7:45 am ACSM Committee Meetings  
7 a.m.-6 pm ACSM Registration open  
8-9:15 am Joseph B. Wolfe Memorial Lecture  
9:30 -5:15 pm ACSM Scientific/Clinical Sessions  
6-8 pm Exhibit Hall Opening Reception  
7-8:30 pm Student Colloquium  
9 pm.-12 am Welcome Party

#### Thursday, June 3

6:30-7:45 am Josephine L. Rathbone Memorial Breakfast  
6:30 am Gisolfi Fun Run  
6-7:45 am ACSM Committee Meetings  
7:30 am-5 pm ACSM Registration open  
8-8:50 am President's Lectures  
9 am-5:15 pm ACSM Scientific/Clinical Sessions  
9:30 am-5 pm Exhibit Hall Open  
12:30-1:30 pm ACSM Business Meeting  
5:45-7:15 pm Interest Group Meetings  
8-9:30 pm Individual Regional Chapter Meetings

#### Friday, June 4

6-7:45 am ACSM Committee Meetings  
6:30-7:45 am Past President's Breakfast  
7:30 am-4 pm ACSM Registration open  
8-9:15 am D.B. Dill Historical Lecture  
9:30 am-5 pm ACSM Scientific/Clinical Sessions  
9:30 am-4 pm Exhibit Hall Open  
5:45 pm New Fellow Reception (inv. only)  
7 pm ACSM Foundation Silent Auction  
7-10 pm Cocktail Reception and Awards Banquet

#### Saturday, June 5

6-7:45 am ACSM Committee Meetings  
8-11:30 am ACSM Registration open  
8-8:50 am President's Lectures  
9 am-4:15 pm ACSM Scientific/Clinical Sessions  
5:30 pm Board Meeting Begins

### 51st ANNUAL MEETING Celebrating 50 Years of Science & Medicine

June 2-5, 2004  
Indianapolis, IN

The 51st Meeting will be held in Indianapolis, IN. More than 5000 attendees will gather to enjoy presentations of original research in a variety of educational formats. The 2004 ACSM Annual Meeting will cap off the year-long anniversary celebration. See <<https://www.acsm.org/meetings/>>



Continued next page



## Upcoming Events

### *ACSM Annual Meeting continued*

#### **Accreditation**

The American College of Sports Medicine is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians. ACSM takes responsibility for the content, quality, and scientific integrity of the CME activity.

#### **AMA/PRA CME Category 1**

The American College of Sports Medicine designates this educational activity for a maximum of 32 category 1 credits toward the AMA Physician's Recognition Award. Each physician should claim only those credits that he/she actually spent in the activity.

#### **ACSM CECs**

The American College of Sports Medicine's Professional Education Committee certifies that this continuing education offering meets the criteria for 32 ACSM Continuing Education Credits.

#### **AAFP**

Application for CME credit has been filed with the American Academy of Family Physicians. **Determination of credit is pending.**

### **Get Certified while attending the ACSM Annual Meeting in Indianapolis, June 2-5, 2004**

For the convenience of the 2004 Annual Meeting attendees, the National Institute for Fitness and Sport (NIFS) is offering the following exams on June 1<sup>st</sup>:

- ACSM Health/Fitness Instructor<sup>®</sup>, Written and Practical
- ACSM Exercise Specialist<sup>®</sup>, Written Retests only
- ACSM Registered Clinical Exercise Physiologist<sup>®</sup>, Written (Initial exams and retests)

NIFS is within walking distance of the Indiana Convention Center and RCA Dome. In addition to the exam, all candidates will receive FREE access to the NIFS 65,000 sq. foot Fitness Center on June 1<sup>st</sup>. For more information, contact Heather Hedrick, MS, RD at <hhedrick@nifs.org>, 317-274-3432, ext. 238 or visit the NIFS website at <www.nifs.org>. To register, visit <www.acsm.org>.

Use your travel time wisely....come to Indianapolis for the meeting AND a certification!

### *Continued from page 2 — President's Message*

A second common motivating reason for attending the annual conference is that our curious minds need the satisfaction of being challenged with new ideas. There is nothing I enjoy more than trying to establish relationships between the information and ideas being presented at a conference and what I have learned previously through classes, reading articles, or even doing my own research. Admittedly, at the end of a full day of presentations my body is being challenged more by low back pain, lack of blood circulation to my butt cheeks, and the dreaded head-nods, but it always seems worth it.

Lastly, many of you may not know this, but the first professional conference attended by many of the current NWACSM board members (including myself) was a regional ACSM conference. Indeed, I consider my attendance to the 1991 NWACSM conference and the 1992 National ACSM conference (the first confer-

ences I ever attended) to be pivotal experiences in my development as a professional. Each conference served to inspire me to seek out my own answers and do my own research, as well as humble me with the realization of how little I really knew about my own field. Thus, attending a good conference can also serve to inspire each of us to be our very best as professionals.

In closing, and on behalf of the entire NWACSM Board, I want to thank Bob Weathers and Seattle Pacific University for organizing and hosting a very memorable conference. Bob has certainly set a benchmark for upcoming annual conferences at the University of Idaho (Moscow, ID - 2005) and Oregon State University (Corvallis, OR - 2006).

— Dan Heil, Ph.D., FACS, NWACSM President  
Associate Professor, Montana State University



## ACSM Certifications

ACSM Certification is available to any professional within the preventive and rehabilitative exercise field who meets the established prerequisites.

Once certification has been earned, practitioners are reviewed every four years to ensure ongoing competence and that the ACSM's high level of standards are maintained.

### **The ACSM Exercise Specialist®**

is a healthcare professional certified by ACSM to deliver a variety of exercise assessment, training, rehabilitation, risk factor identification and lifestyle management services to individuals with or at risk for cardiovascular, pulmonary, and metabolic disease(s). These services are typically delivered in cardiovascular/ pulmonary rehabilitation programs, physicians' offices or medical fitness centers. The ACSM Exercise Specialist® is also competent to provide exercise-related consulting for research, public health, and other clinical and nonclinical services and programs.

#### Minimum Requirements

- A bachelor's degree in an allied health field\* from a regionally accredited college or university (one is eligible to sit for the exam if the candidate is in the last term of their degree program); AND
- Minimum of 600 hours of practical experience in

a clinical exercise program (e.g., cardiac/pulmonary) including exercise testing; AND

- Current certification in Basic Life Support (BLS)

*\* Examples: Nursing, Occupational Therapy, Physical Therapy, Physician Assistant, Physical Education, Exercise Science, Kinesiology, Kinesiotherapy, Physiology, Biology, Exercise Physiology and Human Performance.*

### **The Health/Fitness Instructor certification**

provides professionals with recognition of their practical experience and demonstrated competence as a leader of health and fitness programs in the university, corporate, commercial or community settings in which their clients participate in health promotion and fitness-related activities.

#### Minimum Requirements

- An associate's degree or a bachelor's degree in a health-related field\* from a regionally accredited college or university (one is eligible to sit for the exam if the candidate is in the last term or semester of their degree program), AND
- Possess current adult CPR certification

*\* Examples: Nursing, Occupational Therapy, Physical Therapy, Physician Assistant, Health Care Administration, Physical Education, Exercise Science, Kinesiology, Kinesiotherapy, Athletic Training, Physiology, Sports Management, Biology, Exercise Physiology, Human Performance, Health Science, Recreation Management/Science, and Nutrition.*

## 2004 ACSM Northwest Region's Certification Schedule

	<i>Wrkshp Dates</i>	<i>Certification</i>	<i>Early Bird Deadlines</i>	<i>Deadline</i>
<b>ACSM Health/Fitness Instructor<sub>SM</sub></b>				
Safety/Health/Industrial Hygiene Dept. Montana Tech, Butte, MT	May 12-13	May 14-15	March 1, 2004	March 15, 2004
International Institute for Sport and Human Performance, University of Oregon, Eugene, OR	None	Apr 16-17	Feb 15, 2004	March 01, 2004
PRO Sport Club, Bellevue, WA	Jun 24-25	Jun 26	April 15, 2004	May 01, 2004
Seattle Athletic Club, Seattle, WA	Aug 18-20	Aug 20-21	June 15, 2004	July 01, 2004
PRO Sport Club, Bellevue, WA	Nov 11-12	Nov. 13	Sept 1, 2004	Sept 15, 2004
<b>ACSM Exercise Specialist®</b>				
International Institute for Sport and Human Performance, University of Oregon, Eugene, OR	Jun 17-18	Jun 18-19	April 15, 2004	May 01, 2004



## Upcoming Events

### Continuing Education Opportunities

The 20/20 Lifestyles Clinic at PRO Sports Club offers between 60-80 hours of nationally accredited Continuing Education Courses for fitness professionals as well as the general public. Courses are designed to educate each participant on the pathophysiology, treatment, and exercise programming associated with various special populations. Here is our calendar for the upcoming year. We've added some new classes to compliment the classes we offer annually. Please give us a call to register for any classes you wish to attend.

Thursday, April 22	1pm-3pm	<b>Principles, Materials, &amp; Types of Athletic Shoes &amp; Orthotics (0.2)</b> Instructor: J. Mari Adad, D.P.M.
Tuesday, May 4	1pm-3pm	<b>Principles of Training and Program Design (0.2)</b> Instructor: Mike Zlateff, MS
Saturday, May 15	9am-1pm	<b>Knee Biomechanics and Rehabilitation Principles (0.4)</b> Instructor: Rim Veitas, PT
Tuesday, May 25	1-3pm	<b>Hip Anatomy &amp; Post Rehab Exercises (0.2)</b> Instructor: Rim Veitas, PT
Saturday, June 12	9am-1pm	<b>Obesity &amp; Insulin Resistance (0.4)</b> Instructor: Dr. Mark Dedomenico
Thur-Fri, June 24-25	8am-5pm	<b>ACSM Health/Fitness Instructor Workshop (1.55)</b> Certification Director: Mike Zlateff, M.S.
Saturday June 26	8am-7pm	<b>ACSM Health/Fitness Instructor Exam and Practical</b> Workshop Director: Carl C. Swedberg, C.S.C.S.
Saturday, Aug. 21	9am-1pm	<b>Back Biomechanics and Rehabilitation Principles (0.4)</b> Instructor: Rim Veitas, PT
Saturday, Sept. 18	9am-1pm	<b>Shoulder Biomechanics and Rehabilitation Principles (0.4)</b> Instructor: Rim Veitas, P.T.
Thursday, Sept. 30	1pm-3pm	<b>Asthma and COPD (0.2)</b> Instructor: Carl C. Swedberg, C.S.C.S.
Thursday, Oct. 7	2pm-4pm	<b>Understanding the Basics of Nutrition (0.2)</b> Instructor: Mary Mach, M.S., R.D.
Date to be determined	9am-1pm	<b>Standards of Care for Diabetes Mellitus (0.4)</b> Instructor: Mark Dedomenico, MD
Date to be determined	9am-1pm	<b>Chronic Fatigue and Fibromyalgia (0.4)</b> Instructor: Dr. Mark Dedomenico
Nov. 11-12	8am-5pm	<b>ACSM Health/Fitness Instructor Workshop (15.5)</b> Workshop Director: Carl C. Swedberg, C.S.C.S.
Nov. 13	8am-7pm	<b>ACSM Health/Fitness Instructor Exam and Practical</b> Certification Director: Mike Zlateff, M.S.

**Course dates and times are subject to change and space is limited.** Therefore, individuals interested in attending CECS must register at least one week prior to the respective course to reserve a seat.

- Each course is \$18.00 per 0.1 CEC. (0.1 ACE credits = 1 ACSM credit)
- For more information or to register contact Carl Swedberg (425) 861-6211 x 7451 or Mike Zlateff at (425) 861-6213, or send course fees to (please indicate which class you plan to attend) :

20/20 Lifestyle Clinic c/o Carl Swedberg  
4455 148<sup>th</sup> Ave. N, Bellevue, WA 9800,

Email can be directed to Carl Swedberg: <cswedberg@proclub.com>



## NW Chapter Business and Activities

### A note from the treasurer

As you probably know, our chapter has always had limited financial resources, mostly as a result of the small number of members and the affordable cost of membership. The Executive Board and the Chapter Home Office have been fiscally responsible in their decisions and their spending. The Annual Meeting is the biggest event of the year for our Chapter, and in recent years it has become a major source of income for the Chapter. To that end, the selection of a host site for the Annual Meeting depends in part on its potential for financial success. Of course, we can all make a difference by attending the Annual Meeting; we will definitely learn something new, and we will contribute to the financial stability of the Chapter.

It is the treasurer's responsibility to maintain records of all transactions and inform the chapter membership of our financial situation. The numbers presented below should provide you with a general overview of our financial situation. I am using numbers from the end of FY 2003, as the final numbers of the first quarter of 2004 need to reflect the Annual Meeting figures, and these will only be available after this issue has been published. The most current figures will be included in a subsequent newsletter.

Table 1

Income	Amount	Expenses	Amount
Membership Dues	\$7,000	Home Office salaries	\$4,000
ACSM support	\$3,250	Fall Board Meeting	\$2,200
Gatorade and student grants	\$2,850	Student Grants & student trips	\$1,000
		Social during National ACSM	\$500
		Annual Meeting seed money	\$4,000
		Miscellaneous	\$5,00
<b>TOTAL</b>	<b>\$13,100</b>		<b>\$12,200</b>

All figures have been rounded to increments of \$50.00.

As you can see, table 1 reflects the fact that most of our income comes from our members, and that our greatest expense is the Annual Meeting. Table 2 lists our financial assets at the end of FY 2003.

Table 2

Description	Amount
Balance for FY 2003	\$1,100
Balance on 12/31/2002	\$6,650
Home Office Balance	\$900
Bank Deposit (CD)	\$10,800
<b>TOTAL ASSETS END 2003</b>	<b>\$19,450</b>

All figures have been rounded to increments of \$50.00.

The major financial obligations for 2004 are Home Office salaries (\$4,000), Annual Meeting 2005 seed money (\$4,000), Home Office expenses (\$2,000), and Fall Meeting of the Executive Board in Moscow, ID (\$2,000). It is my hope that we will be able to finish the year with a positive balance, and I will report more on that as soon as I complete my first quarter report.

It is also my responsibility as chair of the Finance Committee to inform our members of our newly developed Sponsorship Subcommittee, and to invite you to participate in its work. Our objective is rather simple (albeit not easy): we are seeking sponsors for the various activities of the chapter, such as the Annual Meeting, the student research grants, the student awards presented during the Annual Meeting, the NWACSM website, or any other activity that benefits

our members. If you are interested in participating in such efforts, please feel free to contact me at [stas@willamette.edu](mailto:stas@willamette.edu).

In closing, I would like to thank you for your continuing support of our chapter, and extend an invitation to send

me your questions and any concerns about this financial report. I will be happy to answer any questions about our finances. Have a wonderful spring!

Stasinos Stavrianeas, Ph.D., NWACSM Treasurer  
[stas@willamette.edu](mailto:stas@willamette.edu), (503) 370-6392



## 2004 NWACSM Annual Meeting awards and poster abstracts

### Results of the student poster competition

The two best undergraduate oral presentations were by Heather Clifton (Willamette University) and A. Spiroski (Montana University). Each received a \$75.00 check.

The three best master's oral presentations were by E. Dickson (Central Washington University), J. Lockwood (University of Oregon), and C. Sims (Central Washington University). Each received a \$100.00 check.

The two best doctorate oral presentations were by B. Torggrimson and B. Wong both from the University of Oregon. Each received a \$100.00 check.

The best poster award went to J. Meendering (University of Oregon) for the master's category and to K. Howlett (Gonzaga University) for the undergraduate category.

### Abstracts accepted for the 2004 NWACSM Annual Meeting.

#### Doctoral student category

#### Does the menstrual cycle or sex influence leg venous compliance?

Britta N. Torggrimson, Jessica R. Meendering, Belinda L. Houghton, John R. Halliwill, Christopher T. Minson, FACSM.  
University of Oregon, Eugene OR, USA

Although women have decreased orthostatic tolerance relative to men, the exact causes for the difference between the sexes are not fully understood. A greater venous compliance (VC) in the lower leg in women may be a contributing factor to their decreased orthostatic tolerance. In addition, the hormonal changes during the menstrual cycle may also impact VC. **PURPOSE:** To explore sex differences in VC and changes in VC over the course of the menstrual cycle. **METHODS:** We studied 3 healthy normally menstruating subjects (24±7 years) at the early follicular (EF), ovulatory (OV), and mid-luteal (ML) phases of a menstrual cycle. Four healthy men (24±4 years) were studied twice, with 2–4 weeks between

visits (M1, M2). After instrumentation of a venous collecting cuff and strain-gauge, the supine subject's leg was positioned above heart level to promote venous drainage for 30 minutes before measuring VC. Venous collecting cuff pressure was applied at 60mm Hg for 8 minutes and reduced at a rate of 1mm/sec to 0mm Hg over 1 minute. We measured changes in calf volume by strain-gauge plethysmography at maximal calf circumference. **RESULTS:** Using a quadratic regression model VC is calculated as the derivative of the pressure-volume curves:

$$VC = \beta_1 + 2 \cdot \beta_2 \cdot (\text{cuff pressure}).$$

$$\text{EF: } VC = 0.107 \pm 0.0175 - 0.0018 \pm 0.00043 \cdot \text{pressure}$$

$$\text{OV: } VC = 0.095 \pm 0.0176 - 0.0017 \pm 0.00034 \cdot \text{pressure}$$

$$\text{ML: } VC = 0.054 \pm 0.0134 - 0.0009 \pm 0.00021 \cdot \text{pressure}$$

$$\text{M1: } VC = 0.086 \pm 0.0109 - 0.0014 \pm 0.00023 \cdot \text{pressure}$$

$$\text{M2: } VC = 0.105 \pm 0.0239 - 0.0018 \pm 0.00085 \cdot \text{pressure}$$

Preliminary observations show similar leg VC in M1, M2 and in the EF and OV phases of the menstrual cycle. However, the ML phase shows decreased VC relative to EF, OV phases, and to VC in men. **CONCLUSION:** These preliminary data show decreased VC during the ML phase when circulating levels of both estrogen and progesterone are elevated. Further investigation will address whether decreased VC in the ML phase is associated with increased tolerance to an orthostatic challenge.

Supported by AHA 0265260Z

#### A role for histamine in active vasodilation

Brett J. Wong, Brad W. Wilkins, Christopher T. Minson, FACSM  
University of Oregon, Eugene, OR, USA

It has been established that nitric oxide (NO) is involved in cutaneous active vasodilation. Recent evidence suggests vasoactive intestinal peptide (VIP) may be involved in active vasodilation and we have recently shown that VIP-mediated dilation includes a substantial NO-dependent portion. Furthermore, VIP has been shown to induce histamine release from mast cells in human skin. Thus, it is possible that the NO portion of active vasodilation may be due to release of histamine. **PURPOSE:** To determine the relative contribution of NO and histamine during whole body heating. **METHODS:** Six subjects were instrumented with 4 microdialysis fibers. Site 1 served as a control and was infused with Ringer's solution. Site 2 received 10mM L-NAME to inhibit NO synthase

(NOS). Site 3 received the H1 receptor antagonist pyrilamine maleate (500 $\mu$ M). Site 4 was infused with L-NAME combined with H1 receptor antagonist (final concentrations of 10mM and 500 $\mu$ M). All infusions were continuous beginning 30 minutes prior to whole body heating and throughout the duration of the heating period. Subjects wore a water-perfused suit and hot water was pumped through the suit to increase core temperature at least 0.8°C. Laser-Doppler flowmetry was used to monitor skin blood flow (SkBF) over each site. Cutaneous vascular conductance (CVC) was calculated as flux/mean arterial pressure and normalized to maximal values via infusion of 28mM sodium nitroprusside. **RESULTS:** In control sites, CVC increased during whole body heating to  $69\pm 3\%$  CVC<sub>max</sub>. CVC values were significantly reduced in sites receiving NOS inhibition ( $32\pm 2\%$  CVC<sub>max</sub>;  $p<0.001$ ) and in sites receiving H1 antagonist only ( $51\pm 3\%$  CVC<sub>max</sub>;  $p<0.05$ ). CVC in sites that received NOS inhibition combined with H1 antagonist was attenuated compared to control ( $33\pm 3\%$  CVC<sub>max</sub>;  $p<0.001$ ). However, there was no difference between NOS inhibited sites and combined NOS inhibitor and H1 antagonist sites. Additionally, NOS inhibited sites and combined NOS inhibitor and H1 antagonist sites were significantly reduced compared to H1 antagonist only sites ( $p<0.05$ ). **CONCLUSION:** The increase in SkBF during whole body heating contains both a histamine component. Furthermore, these data are consistent with a role for VIP in active vasodilation.

Supported by NIH Grant HL 70928

### *Master's student category*

#### *Assessment of a swimming stroke mechanics field test*

J.E.Berry, L.J. D'Acquisto, T. Burnham  
HHPR-Exercise Science Laboratory  
Central Washington University, Ellensburg, WA. 98926

**PURPOSE:** The intent of this investigation was to assess the credibility of a swimming stroke mechanics field test (SMFT) by (1) examining the relationship among SMFT results, swimming efficiency and performance, and (2) to determine if SMFT results discriminate between faster and slower swimmers.

**METHODS:** Collegiate male swimmers ( $n=14$ ) were categorized into a faster ( $n=7$ ) and slower group based on 91.4 and 365.8 m freestyle performances.

The SMFT consisted of 7 x 50 yd (45.7m) freestyle swims on a two-minute cycle. Each swim was completed at a progressively faster velocity with SR (stk $\cdot$ min<sup>-1</sup>) monitored for each effort. Interpolation was employed to determine SR at a given velocity of 1.5 m $\cdot$ s<sup>-1</sup> for individual SR (Y axis) vs. swim velocity profiles. Swimmers also completed a series of sub-maximal and one maximal swim in which expired air was collected via a snorkel apparatus (indirect calorimetry). Swim velocity at a given metabolic power value of 1000 joules $\cdot$ s<sup>-1</sup>, an assumed constant gross efficiency of 9% and an estimated drag coefficient (Toussaint, 1988, 1994) were considered in estimating propelling efficiency (Ep). **RESULTS:** The r value between SR at 1.5 m $\cdot$ s<sup>-1</sup> vs Ep was -0.70 ( $p<0.05$ ), while the relationship between SR at 1.5 m $\cdot$ s<sup>-1</sup> vs the 91.4 and 365.8 m performance swims was -0.73 and -0.79, respectively ( $p<0.05$ ). In addition, the slower performance group had a greater SR ( $40.2\pm 4.6$  stk $\cdot$ min<sup>-1</sup>) compared to the faster swimmers ( $31.2\pm 3.7$  stk $\cdot$ min<sup>-1</sup>) ( $p<0.05$ ) at 1.5 m $\cdot$ s<sup>-1</sup>. VO<sub>2</sub> peak ranged from 3.73 to 4.93 l $\cdot$ min<sup>-1</sup> with no difference between the faster and slower performance groups. The r value between VO<sub>2</sub> peak and the 91.4 and 365.8 m performance swims was 0.13 and 0.17, respectively (NS). **CONCLUSIONS:** The SMFT can be used to assess and perhaps monitor stroking mechanics, and discriminate between talent levels in well trained collegiate male swimmers. The faster swimmers were able to establish a lower stroking frequency at 1.5 m $\cdot$ s<sup>-1</sup>, indicating they covered a greater distance per stroke cycle and therefore had a "better feel" for the water. This contention is further supported by the finding that those individuals that maintained a lower SR at 1.5 m $\cdot$ s<sup>-1</sup> also tended to have a greater propelling efficiency. This finding suggests that the faster swimmers were able to partition a greater portion of the work accomplished during the stroke cycle into overcoming drag force (useful work) and less into giving masses of water a motion change (wasted mechanical work).

#### *IL-6, CRP and CK responses to 20-mile trail race at altitude in novice versus veteran female runners*

Stephen B. Conant, Shelley Hogan, Shayna M. Lemke, Chandi Brown, Mary P. Miles, FACSM, Montana State University-Bozeman, Bozeman, MT

Veteran trail runners anecdotally report less pain and recover more quickly post race than novice trail runners. We hypothesized that a protective effect related



## Abstracts

to the inflammatory response may occur with habituation of downhill running and extensive participation in endurance events. Repeated participation in a 20-mile trail race with 6,800 feet of ascent and 9,500 feet of descent may lead to a lower response of interleukin-6 (IL-6), C-reactive protein (CRP), and serum creatine kinase (CK) accompanied by a more rapid decrease explaining quicker recovery. **PURPOSE:** To determine the inflammatory response of novice versus veteran runners participating in the Ed Anacker Bridger Ridge Run. **METHODS:** Eight endurance trained female runners (mean±SD: Age 42.7±10.9 y, finish time 6.75 h±1.5 h) registered for a 20-mile trail race participated in this study. Groups were divided according to history of previous Ridge Runs and ultra endurance events. Pre-race blood samples were collected on the day before the run. The first of three post race blood samples was collected upon completion of the run (0-hour Post draw) and the next 4 hours later. The final blood draw was performed 24 hours after each subject completed the run (24-hour draw). Plasma and serum samples were analyzed for IL-6 and CRP using ELISA and EIA kits, respectively. Serum was analyzed for CK activity using an enzymatic assay. **RESULTS:** A significant group time interaction ( $P<0.01$ ) for IL-6 was measured, which increased ( $P<0.001$ ) post exercise. The increase from pre-race to 0-hour post was  $0.71\pm0.64$  pg/ml to  $40.2\pm8.92$  for the veteran group and  $0.87\pm0.81$  pg/ml to  $19.1\pm6.81$  pg/ml for the novice group. CRP peak was increased pre-race to 4-hour post  $1.61\pm2.32$  pg/ml to  $4.17\pm2.54$  for the veteran group and  $1.08\pm1.84$  mg/l to  $1.81\pm1.83$  mg/l for the novice group. **CONCLUSION:** This data suggests that extensive exposure to long distance and downhill running may initiate a larger IL-6 response to exercise. Greater IL-6 production is consistent with a training-induced down regulation of glucocorticoid receptors on monocytes reported in the research literature.

Supported by NIH P20 RR-16455-02  
from the BRIN Program of the NCCR.

### ***Circumference measures reflect weight and adipose loss in obese patients following a 12-week behavior management program***

E. Dickson, and V. Nethery, Central Washington University, Ellensburg, WA

An overall reduction in adiposity is a highly desired patient outcome of weight management programs. The relationship between body weight and whole-body adipose tissue loss, with physical reductions of

specific anatomical regions is not clear. **PURPOSE:** To assess the relationship between changes in regional circumference measures, and body mass and whole body adiposity in patients participating in a primary care, clinic-based, multidisciplinary behavioral program. **METHODS:** At-risk obese individuals ( $n=220$ , 61 males 159 females;  $BMI=33.7\text{kg}/\text{m}^2$ ) completed a 12-week clinic-based multidisciplinary lifestyle-oriented program. The program focused on developing better lifestyle decisions by patients and incorporated individualized clinic sessions on nutrition education, behavioral counseling, exercise prescription, and physician assessment. Morphologic measures were taken prior to and at the conclusion of program participation. These data were analyzed (two-way split-plot ANOVA) retrospectively. **RESULTS:** The following morphologic changes were observed (all  $p<0.01$ ): Weight decreased by 4.4kg with significantly greater weight loss in males (6.4kg) than females (3.7kg) and BMI followed accordingly. Body fat decreased by 2.52% with no difference in reduction between males (2.7%) and females (2.4%). Circumference measures decreased at the neck, chest, waist (W), umbilicus (U), hip (H), and thigh, with significant reductions also observed in W:H and U:H ratios. Males had greater reductions than females at the waist and by extension the W:H while females had greater reductions than males at the neck. The magnitude of relative change in each region ranged from -1.0% at the shoulder to -5.0% at the waist and umbilicus. **CONCLUSION:** These data support the concept of broad reductions in body fat across many anatomical locations with differences in the magnitude of loss among regions and between male and female patients. A 12-week individualized, clinic based multidisciplinary program in the primary care setting is effective in improving the morphological status of obese adults.

### ***Is postexercise hypotension explained by a prostaglandin-dependent peripheral vasodilation?***

J. M. Lockwood, M. P. Pricher, L. A. Holowatz, and J. R. Halliwill. University of Oregon, Eugene OR. USA

In normally active individuals, postexercise hypotension after a single bout of aerobic exercise is due to an unexplained peripheral vasodilation. Prostaglandins have been shown to contribute to increased blood flow during and after exercise; however, their potential contribution to postexercise hypotension has not

been assessed. **PURPOSE:** To determine the potential contribution of prostaglandin production to changes in systemic vascular conductance during postexercise hypotension. **METHODS:** We studied nine healthy normotensive men (ages  $23.4 \pm 1.5$ ) before and through 90 min after a 60 min bout of cycling at 60%  $VO_{2peak}$  on a control day and after blockade of prostaglandin production (randomized). For prostaglandin production blockade, subjects received 10 mg/kg of oral ibuprofen. Arterial blood pressure (automated auscultation) and cardiac output (acetylene uptake) were measured. Systemic vascular conductance was calculated. **RESULTS:** Ibuprofen had no effect on pre-exercise values of mean arterial pressure or systemic vascular conductance ( $P > 0.3$ ). After exercise on both days, mean arterial pressure was reduced (control  $-3.1 \pm 1.0$  mmHg; ibuprofen  $-3.6 \pm 1.9$  mmHg, both  $P < 0.05$  vs. pre-exercise) and systemic vascular conductance was increased (control  $9.4 \pm 5.1\%$ ; ibuprofen  $7.5 \pm 5.0\%$ , both  $P < 0.05$  vs. pre-exercise). Changes from pre to postexercise did not differ between the ibuprofen and control days ( $P > 0.8$ ). **CONCLUSION:** These data suggest prostaglandins do not contribute to the increased systemic vascular conductance associated with postexercise hypotension.

*Supported by AHA grant: 30403Z*

### ***Inflammation and exercise-induced arterial hypoxemia in the female asthmatic athlete***

B. Lynn, A.N.H. Hodges, M.S. Koehle, and D.C. McKenzie. School of Human Kinetics, University of British Columbia, Vancouver, BC, Canada.

It has been suggested that habitual exercise training may cause mechanically or chemically mediated endothelial dysfunction in the lung during heavy exercise, which may lead to exercise-induced arterial hypoxemia (EIAH). Elevated plasma P-selectin along with IL-6 have been present in acute lung injury and also after intense exercise. **PURPOSE:** To determine whether asthmatic female athletes (A) have higher prevalence of EIAH and higher plasma levels of soluble P-selectin and IL-6 when compared to nonasthmatic female athletes (NA). **METHODS:** 16 (A) (age= $26.4 \pm 5.7$  yrs; ht= $165.7 \pm 7.6$  cm; wt= $61.7 \pm 10.9$  kg;  $VO_{2max} = 46.8 \pm 8.0$  mL $\cdot$ kg $^{-1}\cdot$ min $^{-1}$ ) and 16 (NA) (age= $26.2 \pm 4.2$  yrs; ht= $167.2 \pm 6.8$  cm; wt= $57.5 \pm 6.0$  kg;  $VO_{2max} = 51.9 \pm 8.2$  mL $\cdot$ kg $^{-1}\cdot$ min $^{-1}$ ) were tested during the mid-follicular phase of their menstrual cycle. Subjects completed an incremental maximal treadmill test on the first day of testing and a run to exhaustion test (RTE) at 90% of  $VO_{2max}$  on the second

day of testing. P-selectin and IL-6 were measured by enzyme immunoassay before and after the treadmill run to exhaustion test. **RESULTS:** On Day 1 EIAH ( $\%SaO_2 \leq 93\%$ ) was seen in 7 of the 16 A and 8 of the 16 NA. On Day 2 during the RTE, 6 of 16 A decreased  $\%SaO_2$  to less than 93%, whereas 9 of the 16 NA developed EIAH. The data failed to show significance ( $p > 0.05$ ) in  $\%SaO_2$  between groups after exercise on Day 1 or Day 2. There was a significant increase over time for both P-selectin and IL-6, but no difference in groups. **CONCLUSION:** The prevalence of EIAH is not significantly higher in an asthmatic population when compared to non-asthmatic athletes. However, increased plasma level of P-selectin and IL-6 were seen in both groups and therefore cannot support the hypothesis that asthmatics show increased levels of inflammatory markers due to lung damage from chronic-recurrent high stresses of breathing during exercise training.

### ***Physiologic responses to sustained high intensity exercise in collegiate distance runners***

P. Matern, V. Nethery, H Papadopoulos, and L.D'Acquisto.  
Central Washington University, Ellensburg, WA

The ability to sustain high intensity aerobic exercise is a characteristic of successful endurance athletes. While a steady state is often assumed to exist for many physiologic parameters when the exercise duration is long, such steady state may not exist for all physiologic systems for the entire duration of high intensity exercise. **PURPOSE:** to examine changes in oxygen consumption ( $VO_2$ ), heart rate (HR), substrate utilization (R), and perceived exertion (RPE) during sustained high-intensity running. **METHODS:** Twelve highly trained male collegiate runners (Mean $\pm$ SE: Age= $20.2 \pm 0.4$  years,  $VO_{2max}$   $60.73 \pm 1.35$  ml/kg/min) completed a 25-minute treadmill run at a velocity equivalent to 1.0 kph above that associated with lactate threshold. This velocity corresponded to  $83.9 \pm 1.1\%$  of aerobic capacity ( $VO_{2max}$ ). Measurement of HR,  $VO_2$ , R, and RPE were collected at five-minute intervals throughout the test. These data were analyzed using a one-way ANOVA with Fisher's post-hoc tests and a probability level of  $P \leq 0.05$  was used to assess the significance of any changes observed in each measured variable over the exercise duration. **RESULTS:** Oxygen consumption increased steadily throughout the run with



## Abstracts

significant increases observed during all but the final segment. The magnitude of these increases ranged from 1.46 ml/kg/min (5-10 minutes) to 0.49 ml/kg/min (20-25 minutes). Heart rate increased steadily ( $P \leq 0.05$ ) over the exercise bout with changes ranging from 7bpm (5-10 minutes) to 2bpm (15-20 minutes). Substrate utilization increased from five to ten minutes ( $0.91 \pm 0.01$  vs  $0.93 \pm 0.01$ ;  $P \leq 0.05$ ) and remained steady for the remainder of the run. Perceived exertion increased steadily throughout the exercise bout with significant increases during 5-minute segment. Initial RPE was  $10.6 \pm 0.5$  while final RPE was  $15.1 \pm 0.5$ . **CONCLUSIONS:** Substrate utilization was the only physiologic parameter to exhibit a sustained steady state for a majority of the exercise bout. Although other physiologic parameters demonstrated statistically significant changes at many of the sequential five-minute measures, the physiologic importance of these observations may be less than the statistical significance suggests. The perceptual responses clearly indicate an increasing state of fatigue for the runners with final RPE values indicative of a "hard" level of exercise.

### *Influence of the menstrual cycle and sex on the skin blood flow response to tilting*

Jessica R. Meendering, Britta N. Torgrimson, Belinda L. Houghton, John R. Halliwill, Christopher T. Minson, FACSM. University of Oregon, Eugene, OR.

Women have decreased orthostatic tolerance compared with men, and anecdotal evidence suggests women are most susceptible to orthostatic intolerance in warm environments. Estrogen and progesterone are known to influence the regulation of skin blood flow, and thus may impact the responses to an orthostatic challenge. **PURPOSE:** To examine sex differences and the influence of the menstrual cycle on cutaneous vascular conductance (CVC) during orthostatic challenges in thermoneutral and heat stress conditions. **METHODS:** Three women not currently taking oral contraceptives ( $24 \pm 7$  years) and 4 males ( $24 \pm 4$  years) have been studied. Female subjects were studied during their early follicular, ovulatory, and midluteal menstrual cycle phases. Male subjects were studied twice within a 2-4 week period. Subjects underwent 2 head up tilt tests on an automatic tilt table. Tilts consisted of progressive 5 minute stages at  $15^\circ$ ,  $30^\circ$ ,  $45^\circ$  and  $60^\circ$  during thermoneutral conditions and again after a  $0.5^\circ$  C increase in core body

temperature via whole body heating. An index of skin blood flow (RBC Flux) was measured by laser-Doppler flowmetry and (CVC) was calculated as  $RBC\ Flux / MAP$ . **RESULTS:** We observed similar decreases in CVC with increasing orthostatic stress in the thermoneutral condition between men and women in the early follicular and ovulatory phases. However, we observed a slight increase in CVC from baseline during the midluteal phase. During heat stress, CVC increased similarly in both sexes, but increased the most in the midluteal phase. When tilting was combined with heat stress the greatest decrease in CVC was observed during the midluteal phase. **CONCLUSION:** These preliminary data suggest the skin blood flow response to an orthostatic challenge differs in the midluteal versus other phases of the menstrual cycle.

Supported by AHA grant 0265260Z

### *Does the splanchnic vascular contribute to postexercise hypotension?*

M. P. Pricher, L. A. Holowatz, J. T. Williams, J. M. Lockwood, and J. R. Halliwill. University of Oregon, Eugene, OR

Postexercise hypotension is characterized by increased systemic vascular conductance that is not compensated by an increase in cardiac output. It is unclear whether or not these hemodynamic changes are limited to skeletal muscle vascular beds. **PURPOSE:** To determine if the splanchnic vascular bed plays a role in postexercise hypotension. **METHODS:** Eleven healthy, normotensive subjects (ten men and one woman,  $21.6 \pm 1.2$  years) were studied before and through 160 min after a 60 min bout of exercise at 60% of  $VO_2$  peak. An automated blood pressure cuff was used to measure mean arterial pressure, and cardiac output ( $Q_c$ ) was ascertained using open circuit acetylene washin technique. Total vascular conductance was calculated ( $Q_c / \text{mean arterial pressure}$ ). Femoral blood flow was measured using ultrasound and splanchnic blood flow was determined by the clearance of indocyanine green. Femoral vascular conductance and splanchnic vascular conductance were calculated as femoral blood flow / mean arterial pressure and splanchnic blood flow / mean arterial pressure, respectively. **RESULTS:** At 60 min postexercise, mean arterial pressure was reduced ( $79.5 \pm 2.0$  mmHg vs.  $83.3 \pm 2.5$  mmHg;  $p < 0.05$ ), total vascular conductance was increased by  $8.0 \pm 7.2\%$  ( $p < 0.05$ ), femoral vascular conductance was increased by



58.9±20.2% (p<0.05), and splanchnic vascular conductance was reduced by 7.0±10.2% (p=0.08). **CONCLUSION:** This suggests there is a sustained splanchnic vasoconstriction during postexercise hypotension that may serve to limit further reductions in arterial pressure.

*Supported by AHA grant: 30403Z*

### *Evaluation of the validity of a non-exercise technique of estimating VO<sub>2MAX</sub>*

R. E. Ramirez, L. Brilla FACSM, G. Chalmers, S.P. Sheremeta.

Western Washington University, Bellingham, WA

**PURPOSE:** This study compared estimated VO<sub>2max</sub> values obtained from a new, non-exercise technique by Omega Wave Sport Technologies (OmegaWave) to those from direct measurement during graded maximal exercise test (GXT) in healthy young athletes. The evaluation of this technique provides information on the effectiveness and accuracy of the new system. **METHODS:** Twenty-six (15 male, 11 female) competitive or recreational athletes completed both tests to obtain two measures of VO<sub>2max</sub>. The OmegaWave system requires approximately 30 seconds of resting electrocardiograph data with the subject supine (Omega mean=66 ml/kg/min). Subjects completed a maximal treadmill GXT within 24 hours of the OmegaWave measurement (GXT mean=59.7 ml/kg/min) **RESULTS:** Statistical analysis revealed a weak correlation (r=0.37), large standard error of the estimate (SEE=6.265 ml/kg/min), and wide range in confidence intervals (±12.3 ml/kg/min). Additionally, the Bland-Altman analysis indicates that in 95% of tests the value reported by the OmegaWave may be well under or greater than (-11% to 38%) the VO<sub>2max</sub> determined by the GXT. **CONCLUSION:** Results suggest the OmegaWave overestimates VO<sub>2max</sub> in young athletes compared to GXT measurements, and it appears that the OmegaWave is a relatively poor predictor of VO<sub>2max</sub> in the study population. Further research is required to support the findings of this study and to investigate the accuracy of the OmegaWave system more thoroughly.

### *Exercise dose required to enhance quality of life in cancer survivors*

C. Sims, T.R. Burnham, V.M. Nethery, M.A. Kollman, L. D'Aquisto, and J. Tuttle

Exercise Science Laboratory, Central Washington University, Ellensburg, WA

The treatment of certain cancers is often accompanied by serious psychological and physiological side effects that can greatly reduce the quality of life (QOL) in cancer survivors. These include: decreased aerobic capacity, muscular atrophy, decreased strength and flexibility, adverse body composition changes, depression, anxiety, and fatigue. Previous studies have shown exercise to be effective in reducing or alleviating many of these side effects, leading to an improvement in overall QOL. However, most studies have utilized a pretest-posttest design that is sufficiently insensitive to recognize the exercise dose needed to generate significant change in QOL. **PURPOSE:** To investigate the exercise dose required to significantly improve QOL in cancer survivors.

**METHODS:** Twenty cancer survivors (15 female, 5 male, 43-79 years of age) served as subjects. Subjects participated in a ten-week low to moderate intensity (25-40% heart rate reserve) exercise program for 14-20 minutes, three times a week. QOL was assessed weekly with the Quality of Life Index for Patients with Cancer. This scale is composed of 14 items evaluating physical condition, normal activities, and personal attitudes on general quality of life.

**RESULTS:** ANOVA results revealed a significant increase in QOL over the ten weeks (p=.0001). Follow-up analysis (Scheffe post-hoc test) revealed a significant improvement in overall QOL by week 6 (p<.05). Of the 14 sub-scale components that compose the overall QOL score, the subjects improved most on their perceived strength, ability to sleep and their ability to perform daily tasks. **CONCLUSION:** These results indicate that low to moderate intensity aerobic exercise is beneficial in improving QOL and at least six weeks of aerobic activity are needed to see a significant improvement in QOL. This relatively low dose-response relationship should be beneficial in optimizing cancer survivor adherence to an exercise program.

*Funded by grant number G-01-017, Cancer Treatment Research Foundation*

### *The influence of the use of different anticoagulants in test tubes in the determination of the lactate threshold*

J.A. Tuttle, C. Papadopoulos, V.M. Nethery, and J. Horsley. Central Washington University, Ellensburg, WA. E-mail: JTuttle\_1980@msn.com

**PURPOSE:** The purpose of this study is to investigate the differences among the use of different anticoagulants in test tubes for the analysis of blood



## Abstracts

lactate concentration and to determine the influence of these agents in the determination of the different definitions of the lactate threshold. **METHODS:** Eight well-trained competitive cyclists (age:  $33.9 \pm 2.2$  yrs; height:  $177.1 \pm 2.5$  cm; weight:  $74.4 \pm 3.1$  kg; body fat  $12.1 \pm 1.6\%$ ;  $\text{VO}_{2\text{max}}$ :  $58.7 \pm 3.3$  ml·kg<sup>-1</sup>·min<sup>-1</sup>) completed a single continuous incremental maximal exercise test to determine their individual lactate profile. During the maximal exercise test, oxygen consumption, heart rate, and blood lactate were measured. Blood samples were collected at rest, post-warm-up, at the end of each exercise stage and at maximal exercise through a venous catheter placed in an antecubital vein. Each blood sample drawn was analyzed immediately without any treatment or placed in tubes containing potassium oxalate (PO) or lysing agent. A one-way ANOVA was used to determine statistical differences between different tubes at each lactate threshold definition. A two-way ANOVA with repeated measures was used to determine differences among test tubes over time. **RESULTS:** Lactate concentration in tubes containing PO and lysing agent were significantly ( $p < 0.05$ ) higher especially at the higher exercise intensities of the exercise test. However, the workloads associated with the lactate threshold (LT) definitions of the breakpoint, 1 mM above baseline and the fixed LT definitions of 2.5 mM and 4.0 mM were not significantly ( $p > 0.05$ ) different among test tubes. **CONCLUSION:** These results indicate the importance of standardizing blood measures when comparing results from different studies and caution should be used to interpret different blood handling methodologies used to prescribe exercise intensity and monitor training adaptations.

*Supported by Central Washington University's Seed Grant Program*

### Undergraduate student category

#### ***Onset of cardiovascular drift does not alter energy expenditure during prolonged exercise***

H.L. Clifton, G.K. Southard, S. Stavrianeas.  
Willamette University, Salem, OR.  
Email: hclifton@willamette.edu

Cardiovascular drift (CVD) is a commonly observed response to prolonged exercise at moderately high intensities ( $>60\% \text{VO}_{2\text{max}}$ ). Although many studies have explored the possible causes of CVD under a variety of experimental conditions, no reports of the

metabolic cost of CVD were found in the literature. **PURPOSE:** The study aims at examining potential changes in the consumption of energy upon onset of CVD in endurance trained athletes at an intensity equivalent to lactate threshold (LT). **METHODS:** Four (4) endurance trained ( $>45$  min, 4 days/wk) male runners (19-22 yrs) completed two tests (T1, T2) on an electrically braked cycle ergometer. T1 was an incremental exercise test (initial workload 50W, increased by 15W every 2 minutes) to volitional fatigue, and allowed the determination of  $\text{VO}_{2\text{max}}$  and exercise intensity at LT. During the test, heart rate (HR) was measured continuously using a four-lead ECG, respiratory gases were collected and analyzed using a breath-by-breath metabolic gas analysis system, and blood lactate levels (BLa) were measured at the end of each stage from a hyperemized earlobe using a portable lactate analyzer. Following the test, LT was established as the breakpoint in the lactate curve. T2 was designed to elicit CVD and consisted of a steady state test to volitional fatigue, at an intensity equal to LT. HR and  $\text{VO}_2$  data were recorded continuously, whereas BLa samples were collected every five minutes throughout the test. **RESULTS:** It was determined from T1 that LT ( $3.5 \pm 0.58$  mmol/dl) corresponded to  $64.4 \pm 6.4\% \text{VO}_{2\text{max}}$  ( $48.8 \pm 3.1$  ml/kg/min). T2 at the prescribed intensity elicited CVD in all subjects, and this occurred between 15.3 and 24.5 minutes into the test period. The respiratory exchange ratio (RER) remained consistent throughout the duration of the test. Additionally,  $\text{VO}_2$  reached a steady state, and despite some transient fluctuations throughout the activity, there was no clear effect of CVD. Finally, BLa levels were not altered by the onset of CVD. **CONCLUSION:** Our findings indicate that the clearly established onset of CVD is not accompanied by increased energy expenditure during prolonged submaximal exercise, as measured by oxygen consumption and blood lactate levels.

*Funding provided by Willamette University  
Carson Undergraduate Research Grants Program.*

#### ***Influence of musical selection on energy expenditure and rate of perceived exertion***

S. Francisco  
Pacific University, Forest Grove, Oregon

This project investigated the influence of various musical tempos on the rate of perceived exertion and energy expenditure of novice runners. The results may provide important information for the general

population about how one can best perform, with or without music. In some cases, this information may allow for longer workouts, enhanced performance, and higher motivation to continue exercising. **Methods:** The participants consisted of 10 college-age students (5 males and 5 females) who were novice runners. The study consisted of three test conditions, each tested twice during the same test period. The order for the independent variable (music tempo) was chosen randomly by shuffling the music on the CD. Participants self-selected a genre of music for the test. For the test, participants utilized a metabolic cart to measure energy expenditure via gas analysis of exhaled air. To begin the test, each subject was instructed to begin running and increase his or her workload to a comfortable level. At the end of each of the preset four-minute test, a Rate of Perceived Exertion (RPE) scale was held up in order to get a reading of the subject's RPE. The subject then estimated the length of time he felt that he had been running and rested for four minutes before beginning the next condition. **RESULTS & CONCLUSIONS:** It was found that there was no significant difference between any of the tempo conditions on rate of perceived exertion. There was a significant difference found with the presence of music on the energy expenditure and the self-selected speed of the participants. This difference was found between the no-music condition and both the slow-paced and fast-paced music. There was no difference between slow-paced and fast-paced music. From this study, it can be considered that with the presence of music, novice runners are able to run faster, which in turn expends more energy. Therefore, for novice runners, music may enhance the quality of their bout of exercise.

### *Correlational analysis of physical fitness and orientation and mobility skills in a visually impaired population.*

V. Johnson\*, J. Penry\*, D. Kish\*\*, K. Roper\*\*, B. Beam\*\* and J. T. Peterson\*.

\*Department of Health, Human Performance and Athletics, Linfield College, McMinnville, OR.

\*\*Department of Kinesiology, California State University Fullerton, Fullerton, CA.

Current research indicates that visually impaired individuals require greater energy expenditure to carry out simple tasks of daily living. Also, many of these individuals live fairly sedentary lifestyles. In the visually impaired (VI) the extent to which physical fitness and lifetime physical activity influences

the ability to interact with ones environment has not been investigated. **PURPOSE:** The aim of this study is to explore the relationship between physical fitness and orientation and mobility (O&M) skills in a visually impaired population. Also, measures of physical fitness of the VI will be compared to sighted individuals. **METHODS:** Visually impaired individuals (n=25) and age and gender matched sighted controls (n=25) between the ages of 12 and 65, will be recruited for this study. All subjects will have the following parameters assessed: Clinical: blood pressure, fasting blood glucose, fasting cholesterol (total, LDL & HDL) and triglycerides. Fitness evaluation: Predicted VO<sub>2</sub> max, muscular fitness (strength and endurance), lower trunk flexibility, body composition, reaction time, trunk stability, and balance. In addition, the visually impaired population will have their orientation and mobility skills assessed by a certified O&M specialist. This study has been approved by the Institutional Review Board at CSUF. **RESULTS:** We expect that VI individuals will have a positive correlation between measures of physical fitness and O&M skills. We also hypothesize that the visually impaired group will score lower overall in the fitness evaluation. However, contrary to much of the current literature, we believe that those VI individuals who score high on the fitness test will be as fit, if not fitter, than their age, gender matched sighted control. **CONCLUSION:** The results of this study are essential for the understanding of the relationship between physical fitness and O&M skills in the visually impaired. These findings will be useful in developing physical fitness programs designed to improve O&M skills in the visually impaired, thus increasing efficiency in the day to day task performance required for independent living.

### *Between gender comparison of vertical kinematics*

K. Kunder, C. LeBeau, A. Zink  
Gonzaga University, Spokane, WA

**PURPOSE:** The purpose of this study was to examine the differences in jumping kinematics between males and females during a maximal vertical jump. **METHODS:** Sixteen subjects (8 males and 8 females) were videotaped while performing three counter-movement vertical jumps with maximal effort. All trials were digitized and the trial demonstrating the largest vertical hip displacement during upward trajectory was used to calculate vertical jump height and the peak vertical velocity of the jump.



## Abstracts

The range of motion (ROM), and the minimum and maximum angular displacements and velocities for the hip, knee, and ankle joints were also calculated for this trial. **RESULTS:** Male subjects demonstrated a significantly greater vertical jump height ( $P=0.005$ ) and peak vertical velocity ( $P=0.002$ ) than female subjects. Male subjects also demonstrated a significantly greater amount of hip flexion ( $P=0.001$ ), total ROM for the hip ( $p=0.002$ ), and knee angular velocity during the concentric portion of the jump ( $P=0.022$ ) than female subjects. **CONCLUSION:** There is a difference in jumping technique between males and females that might partially account for differences in vertical jump height observed between genders.

### *An initial assessment of the metabolic costs of using the Quadmill™.*

Howlett, K.L., T.L. Keniston, A.L. Grassl, A.R. Olsson, C.T. Eidem, and D.J. McCann. Department of Exercise Science, Gonzaga University, Spokane, WA.

**PURPOSE:** The purpose of this experiment was to determine the metabolic cost of exercise on a novel piece of exercise equipment called the Quadmill™. Exercising on the Quadmill™ requires the subject stand on a stationary platform that oscillates in the vertical and horizontal planes. The rate of oscillation (osc/min) determines the intensity (I) of the exercise and may range from 38 to 65 osc/min. **METHODS:** Ten college-aged subjects (5 male, 5 female) performed exercise on the Quadmill™ for 2.5 min at three exercise intensities (45, 52, and 59 osc/min). A SensorMedics Vmax229L metabolic system was used to record heart rate (HR) and the rate of oxygen consumption ( $VO_2$ ) during rest, exercise, and recovery. Total oxidative cost during the exercise was determined by integrating the area under the curve for  $VO_2$ . Total excess post exercise oxygen consumption (EPOC) was similarly determined. A predictive model of the metabolic cost per kilogram of mass and rate of oscillation was determined by performing a linear regression for each subject, and subsequently pooling the regression parameters. **RESULTS** Group mean peak HR and total caloric expenditure both increased linearly with exercise intensity. Peak HR at the end of exercise for the three intensities were 137, 150, and 159 bt/min, respectively. The group mean linear model of the cost of exercise was:  $[\text{Cost} (\text{kcal}\cdot\text{min}^{-1}\cdot\text{kg}^{-1}) = 0.0028 \text{ Intensity} (\text{osc}\cdot\text{min}^{-1}) - 0.0839 \text{ kcal}\cdot\text{min}^{-1}\cdot\text{kg}^{-1}]$ . The percentages of total oxygen consumed during exercise and recovery for the three intensities were as

follows: Exercise: 43.5, 41.9, and 35.6 %, EPOC: 56.5, 58.1, and 64.4 %, respectively. **CONCLUSION:** The total caloric cost of using the Quadmill™ was small. However, the relatively large EPOC suggests the device induces a significant anaerobic challenge to the user. Consequently, the device appears to be best suited for sports-specific anaerobic training.

### *Correlation of experience and performance measures with playing status in college football*

Neighorn C, Pakula A, Penry J & Peterson J.  
Department of Exercise Science, Linfield College, McMinnville, Oregon 97128, USA.  
cneigho@linfield.edu

**PURPOSE:** The purpose of this study was to assess the relationships of playing experience and speed agility quickness (SAQ) performance measures with playing status of NCAA Division III college football players ( $N=355$ ). **METHODS:** Playing status (starter or non-starter), years of experience (EXP), and SAQ performance measures consisting of the 40 yard dash (40), vertical jump (VJ), seated medicine ball put (SMP), modified shuttle run (AG), and standing long jump (SLJ) were recorded, in nine position groups over a six-year period. **RESULTS:** Forward stepwise linear regression analysis revealed EXP and VJ were significant contributors to the playing status across all groups. The playing status of three position groups also showed significant ( $P < .001$ ) relationships with selected SAQ measures (offensive lineman, SMB, EXP ( $r=.45$ ,  $r=.38$ ); defensive back, SMB ( $r=.46$ ); receivers, AG, 40 ( $r=.58$ ,  $r=.56$ )). The current finding that VJ has the strongest correlation ( $r=.30$ ) with overall playing status is consistent with similar studies in other populations. **CONCLUSIONS:** This information is significant for football coaches and other fitness professionals who seek to accurately assess playing potential. This study also suggests that specific training within position groups for dynamic strength and speed is crucial in determining playing status. The SAQ performance test is a useful tool for assessing playing potential in NCAA Division III college football players.

### *Bacterial contamination in water bottles: is the reuse of water bottles safe?*

T. C. Oshiro and S. O. Henry  
Pacific University, Forest Grove, OR

The International Bottle Water Association (IBWA) reported that Americans consumed five billion gallons of bottled water a year. Many Americans buy their water in a bottle because it is convenient to carry from home to the work place. Water bottles are also common sights at fitness centers. Although many of these water bottles were originally manufactured for one time use, people often reuse the bottles with or without proper washing. The purpose of this study was to investigate the bacterial contamination of commonly used water bottles. **METHODS:** Over the course of a week, a sample of water was collected from each water bottle utilized in the Pacific University fitness center. A questionnaire assessed relevant information regarding the background of the water sample and water bottle (purchase date, washing history, refilling history, etc.). Each water sample was collected in a sterile filter funnel and cultured for *E. coli* immediately after collection. After 24-hour incubation at 35°C, bacteria colonies were counted under a microscope. **RESULTS:** Of thirty samples analyzed, seven were free of bacteria, eight contained *E. coli*, eight contained coliforms, and seven contained both *E. coli* and coliforms. Five contained too many bacteria, noted as too numerous to count (TNTC). **Conclusion:** Bacterial contamination was discovered in the majority of water bottles utilized in the fitness center. However, based on self-reported information, no significant correlations were found between contamination and bottle washing frequency, bottle washing method, type of water bottle, or age and use of water bottle. Further research needs to be conducted.

*This study was partially funded by Pacific University Undergraduate Research Funds.*

### ***Load carriage in a simulated escape: a multiple regression equation to predict wild land firefighter escape***

A. Spiroski, B.C. Ruby, FACSM, and S.E. Gaskill, FACSM  
The University of Montana, Human Performance Lab, Missoula, MT, 59812, email: anamishel@hotmail.com

**PURPOSE:** The purpose of this experiment was to develop a multiple regression equation to predict hiking speed (HS, m·sec<sup>-1</sup>) during load carriage in a simulated escape situation. **METHODS:** Subjects included recreationally active males (n=20) and females (n=20). Descriptive data including height (173.0±12.2 cm), weight (73.3±18.7 kg), age, and body composition (15.9±7.8 %fat) from hydrostatic weighing were

recorded. VO<sub>2</sub>peak (ml·kg<sup>-1</sup>·min<sup>-1</sup>) was determined using a calibrated ParvoMedics computerized metabolic system. Ventilatory threshold (VO<sub>2</sub>vt, ml·kg<sup>-1</sup>·min<sup>-1</sup>) was determined using ventilatory equivalents, excess CO<sub>2</sub> and V-slope methods independently evaluated by two investigators. Hiking speed was measured under load carriage (20.45 kg pack) over a predetermined trail (length=646 meters, vertical rise=125 meters, average grade=19.3%). A multiple forward stepwise regression was then calculated with HS as the dependent variable and independent variables; VO<sub>2</sub>vt, VO<sub>2</sub>peak, fat free mass (FFM, kg), %fat and body weight (kg). **RESULTS:** A significant multiple regression (R=0.8221) was calculated as follows: HS (m·sec<sup>-1</sup>) = -(BW \* 0.003503) + (VO<sub>2</sub>peak \* 0.014881) + (VO<sub>2</sub>vt \* 0.008407) + (FFM \* 0.009554) - 0.004831. **CONCLUSION:** Aerobic fitness, both maximal and submaximal, as well as body size and fat free mass are important determinants of steep uphill escape speed for wild land firefighters carrying a standard pack. VO<sub>2</sub>peak accounted for the greatest contribution to escape speed (r=0.5557) and thus aerobic fitness should be seriously considered during hazardous wildland firefighting. It is possible to predict hiking speed under load carriage if aerobic fitness and body size are known. This information could be useful in evaluating wild land firefighters who are most likely to encounter an escape situation.

### ***Non-student category***

#### ***Physiological Responses to Hatha Yoga: Insights into the Exercise Stress of Asanas***

S.E. Blank, FACSM, Clinical and Experimental Exercise Science Graduate Program, Washington State University Spokane, Spokane, WA

Hatha yoga asanas (poses) practiced according to the Iyengar tradition emphasize precise postural alignment, muscular strength and endurance, flexibility, and balance. **PURPOSE:** The purpose of the study was to evaluate acute cardiovascular, metabolic, and ventilatory responses to Hatha yoga practiced in the Iyengar tradition. This study was also designed to acquire preliminary data on the impact of postural alignment on physiological responses. **METHODS:** Healthy intermediate/advanced level yoga practitioners (n=15 females) were monitored for heart rate (HR), oxygen uptake, and brachial arterial blood pressure (n=9) during a 90-min asana practice. The practice included: supine, seated, standing, inver-



## Abstracts

sions, and push up to back arch asanas. Subjects maintained poses for at least one minute and for as long as five minutes. **RESULTS:** Cardiovascular, metabolic, and ventilatory responses were significantly ( $p < 0.5$ ) greater in standing asanas, inversions, and push up to back arch versus supine and seated asanas. The average metabolic cost (METs) of each pose did not exceed 5 METs and HR during practice did not exceed 80% of age-predicted maximal HR. The most physiologically challenging asanas were: back arch (Urdhva Dhanurasana, Sanskrit name), Warrior III (Virabhadrasana III), and handstand (Adho Mukha Vrksasana). Blood pressure responses during physically demanding asanas were significantly affected by the type of asana performed and postural alignment. **CONCLUSION:** Asana practice was classified as mild to moderate intensity exercise without evidence of a sustained cardiopulmonary exercise stimulus. Intermediate and advanced practitioners maintained poses for up to 5 min without stimulating an undesirable pressor response. However, postural alignment significantly influence blood pressure responses during asana practice indicating that adherence to this aspect of the Iyengar tradition has relevant physiological consequences for the yoga practitioner.

### *Swimming performance and velocity at OBLA are linked to propelling efficiency*

G.W. Boggs, J.E. Berry, P. Matern, C.C. Papadopoulos, L.J. D'Acquisto  
Exercise Science Laboratory, Department of Health, Human Performance and Recreation.  
Central Washington University, Ellensburg, WA.

Maximal aerobic power does not discriminate between faster and slower swimmers (D'Acquisto, 2003), rather, talented swimmers are characterized by a greater propelling efficiency (Ep) (Toussaint, 1994) and their ability to establish a greater velocity at OBLA ( $V_{OBLA}$ ) (Maglischo, 1993). **PURPOSE:** To examine the relationship among Ep,  $V_{OBLA}$ , and swimming performance in trained swimmers. It was hypothesized that the ability to sustain a greater  $V_{OBLA}$  was related to skill level as measured by Ep and selected kinematic parameters. **METHODS:** Trained collegiate male swimmers ( $n=14$ ) were categorized into a faster (F,  $n=7$ ) and Slower (S) group based on 91.4 and 365.8 m freestyle performance times. Expired air was collected via a snorkel apparatus (indirect calorimetry) during a series of submax and one max swim. Stroke

rate (SR,  $stk \cdot min^{-1}$ ) was monitored, and a finger stick for the determination of blood lactate (Bla; YSI analyzer) was performed following each swim. Interpolation was employed to determine swimming velocity at a Bla of 4 mM ( $V_{OBLA}$ ). Swimming velocity at a given metabolic power value of 1000 Watts, an assumed constant gross efficiency of 9% (Toussaint, 1994) and an estimated drag coefficient (Toussaint, 1988) were considered in determining Ep. **RESULTS:** For both talent groups,  $V_{OBLA}$  corresponded to ~67%  $VO_2$  peak; however, the faster swimmers established a greater velocity at OBLA ( $1.16 \pm 0.04 m \cdot s^{-1}$ ) compared to the slower group ( $1.01 \pm 0.13 m \cdot s^{-1}$ ) ( $p=0.01$ ). SR at  $V_{OBLA}$  was similar between groups (~33-34  $stk \cdot min^{-1}$ ), but the faster group maintained a greater distance per stroke cycle ( $2.05 \pm 0.23$  vs  $1.82 \pm 0.14 m \cdot stk^{-1}$ ,  $p=0.05$ ). Estimated Ep values ranged from ~30 to 63% at a given metabolic power of 1000 Watts (~66%  $VO_2$  peak). The r values between the 91.4 m and 365.8 m performance swims vs.  $V_{OBLA}$  were 0.82 ( $p=0.0003$ ) and 0.65 ( $p=0.0112$ ), respectively, while the r value between  $V_{OBLA}$  vs Ep was 0.89 ( $p < 0.0001$ ). No difference in peak aerobic power or peak blood lactate was found between groups. **CONCLUSION:** The faster swimmers ability to establish a higher velocity at OBLA was related to their greater propelling efficiency. This suggests that at a given metabolic power demand, the faster swimmers were able to partition more of the total mechanical power output into overcoming drag forces (useful power) and less into giving masses of water a kinetic energy change (wasted power). On a practical note, the faster swimmers had a better "feel" for the water as evidenced by a greater distance per stroke cycle at  $V_{OBLA}$  while maintaining the same stroke rate as their slower counterparts.

### *Effects of carbohydrate supplementation on sIgA during long duration arduous work*

S.G. Harger, S.E. Gaskill FACSMM, B.C. Ruby FACSMM,  
University of Montana, Missoula, MT 59801,  
email: stephanie\_harger@yahoo.com

Prior short-term exercise studies have shown no effect of carbohydrate (CHO) supplementation on post-exercise suppression of salivary Immuno-gobulin-A (sIgA). **PURPOSE:** This study evaluated the effects of CHO supplementation in wildland firefighters (WLFF) over an extended 12-hr work shift on post-exercise and 12-hr recovery sIgA values. **METHODOLOGY:** Subjects were 29 WLFF evaluated during an extended shift of firefighting. In a single blind,



random crossover design, WLFF on subsequent days received either a CHO [200ml/hr, 20% CHO (160 kcal/hr)] or placebo (PLA) drink each hour. At the completion of the shift the CHO group received an additional bolus of 400 kcal CHO. Four min forced salivary samples were collected pre- and post-shift and the morning after each treatment. Samples were analyzed using an Elisa assay. A two-way repeated measures ANOVA was used to evaluate the salivary data. **RESULTS:** Immediately post-shift both groups had a significant decrease in sIgA content over pre-shift values while the CHO group had significantly less sIgA suppression compared to the PLA group (pre-shift: CHO=429±139, PLA=437±159; post-shift: CHO=290±160, PLA=230±111,  $p<0.05$ ). Following 12 hours of rest, the CHO groups had returned to pre-shift values, while the PLA group remained significantly immune depressed (CHO=442±171, PLA=337±136,  $p<0.05$ ). Additionally, during the final 6 hours of the CHO trial the subjects performed 23% more work (CHO=486±36, PLA=395±28 kcal/hr,  $p<0.01$ ) and maintained higher blood glucose values compared to PLA, but there were no differences in RPE across trials. **CONCLUSION:** Exercise has been shown to cause a decrease in sIgA and is associated with increased incidence of upper respiratory tract infection. CHO supplementation during long shifts of arduous work in WLFF enhances maintenance of immune function and improved recovery after extended arduous work in spite of the greater self-selected work with CHO. The mechanism for the decreased immune function is unknown but may be related to increased cortisol concentrations associated with longer duration exercise.

*Supported by the U.S. Forest Service,  
Missoula Technology Development Center.*

### **Changes in body composition and dietary intake over a season in reforestation workers**

D. Roberts, Selkirk College, Castlegar, British Columbia, Canada. E-mail: droberts@selkirk.bc.ca

The occupation of tree-planting has been shown to involve extremely high work-loads and an injury rate which at 12% is well in excess of the all-industry norm. Recently, it has also been demonstrated that planting results in hypoglycaemia and a stress state with increased levels of catecholamines, cortisol, and acute inflammatory proteins. **PURPOSE:**

To further characterize the physiological demands experienced by these workers changes in body composition, blood glucose and cortisol levels were examined and dietary intake recorded. **METHODS:** Anthropometric measures (six skinfold sites, height, and body mass), plasma cortisol samples and blood glucose curves were collected from 17 female and 20 male (age and experience matched) tree-planters early in the season and again 30 days later (following 23 days of planting). Dietary intake was assessed by 3-day diet records. **RESULTS:** Planters worked a daily mean of 5.9±2.9 hours at between 40 to 70% of  $VO_2$ max, carrying 26.3 ± 5.3% of body weight in their planting bags. Consumption of carbohydrate beverage or hourly food intake prevented the development of hypoglycaemia, and was associated with a 40% reduction in the incidence of injury or illness. In spite of a high caloric intake a significant loss of body mass occurred. Higher levels of adiposity early in the season were associated with lower fitness level, greater fat mass losses, and higher injury /illness scores. In general the intake of specific nutrients was in excess of Dietary Reference Intakes (DRI), however, the consumption of polyunsaturated fats and fibre were consistently low at 68±13 % and 89±16% of the DRI, respectively. Cortisol levels were exceptionally high at all time points in 59% of females.

	Early- to Late-Season Changes			Dietary Intake		
	Body Mass (kg)	Body Fat (%)	Total kcal/day	%Carbo	%Protein	%Fat
<b>Females</b>						
Mean	-1.2	-2.6	4025	50	13	36
SD	1.8	2.5	460	7	2	5
<b>Males</b>						
Mean	-2.4	-0.9	4791	51	15	34
SD	2.0	0.8	782	7	3	5

**CONCLUSION:** The loss of body mass in spite of high caloric intakes confirm the extreme physiological load experienced by tree-planters. Further work is required to elucidate the significance of diet and body composition on injury and illness in this population.

*This research supported by grants from FERIC, FRIAA and Weyerhaeuser Company Ltd, Forestlands Division and in part by The Gatorade Sport Science Institute.*



## Abstracts

### *Is postexercise hypotension explained by an elevation in skin blood flow?*

Brad W. Wilkins, Christopher T. Minson FACSME, and John R. Halliwill. University of Oregon, Eugene OR

Following an acute bout of exercise there is a persistent and unexplained rise in systemic vascular conductance that is not completely offset by an increase in cardiac output. These hemodynamic changes manifest in a postexercise hypotension, often sustained for ~2 hours in healthy normotensive individuals. **PURPOSE:** Determine the potential role of the cutaneous circulation in postexercise hypotension. **METHODS:** Studies were performed in a temperature controlled laboratory maintained between 22 and 24°C. Arterial blood pressure was measured via an automated sphygmomanometer (Dinamap), and core body temperature was measured with an ingestible temperature pill (HQI). Red blood cell flux (laser Doppler flowmetry; Moore DRT4) was monitored at four skin sites (chest, forearm, thigh, and shin) and cutaneous vascular conductance (CVC) was calculated (red blood cell flux/mean arterial pressure) and scaled as % maximal CVC (local heating to 43°C). Five subjects (3 men and 2 women; age 23±2; VO<sub>2</sub> peak 44.3±1.9) volunteered for this study. Following 30 minutes of supine rest, subjects exercised on a bicycle ergometer for one hour at 60% of their peak VO<sub>2</sub>. Subjects were then positioned supine for 90 minutes. **RESULTS:** Exercise elicited postexercise hypotension reaching a nadir at 50 minutes postexercise (73±2 vs. 79±2 mmHg pre-exercise; p<0.05). Core body temperature increased with exercise (38.1±0.1 vs. 36.9±0.2°C pre-exercise; p<0.05), returning to pre-exercise values at 50 minutes post-exercise (37.0±0.1°C vs. pre-exercise; p=0.6). CVC at all four skin sites was elevated immediately after the exercise bout (14.8±2.1 vs. 8.2±1.5% CVC<sub>max</sub> pre-exercise; p<0.05). Importantly, CVC at all four skin sites returned to pre-exercise values 60 minutes postexercise (7.7±1.5% CVC<sub>max</sub> vs. pre-exercise; p=0.7); however, mean arterial pressure remained significantly reduced (74±2 mmHg vs. pre-exercise; p<0.05). **CONCLUSION:** Although transient changes in CVC occur postexercise, they do not appear to play an obligatory role in mediating postexercise hypotension under thermoneutral conditions.

Supported by AHA grant: 30403Z

## News and Views

### *Job opportunities*

#### *Director of the Bone Research Lab, Oregon State University*

The Department of Exercise and Sport Science, in the College of Health and Human Sciences at Oregon State University, is seeking experienced, dynamic, and visionary candidates for the position of Director of the Bone Research Laboratory (BRL). Current NIH-funded research projects of the associated faculty in the BRL focus on building peak bone mass during youth and biomechanics of falls in the elderly. There is the opportunity and commitment to expand the focus of the BRL under the leadership of the new director. Faculty affiliated with the BRL have expertise in exercise physiology, biomechanics, biomedical engineering, nutrition, sports medicine, physical therapy, and gerontology. The BRL is also committed to “research to practice” through outreach programs across the state.

Responsibilities of the Director will be to build upon the interdisciplinary, extramurally funded research programs of the BRL, and to teach graduate and/or undergraduate courses in area of expertise, to mentor graduate students, to engage undergraduate students in the research process, and to provide institutional, professional and community service.

Qualifications: Applicants should possess a Ph.D., M.D. or equivalent in a basic or applied science related to bone health and have a record of high-quality, peer-reviewed publications and extramural funding, and experience directing a research lab or as principle investigator of federally funded research grants. Preference will be given to those applicants with service on study sections or other national advisory bodies and university teaching experience. Evident commitment to cultural diversity and education equity and a demonstrable commitment to promoting and enhancing diversity are required.

This is a tenured or tenure-track, full or associate professor-rank faculty position. An associate professor would have demonstrated achievement in scholarship and creative activity that establishes the individual as a significant contributor to the field or profession, with potential for distinction. A full professor would have distinction in scholarship, as evident in the candidate’s wide recognition and significant contributions to the field or profession with an outstanding record of accomplishments sufficient to be accepted as a tenured professor in the College of Health and Human Sciences. This is a 9-month position, with the potential for additional months’ salary based on external funding sources.



For further information, visit the Department web page at: <<http://www.hhs.oregonstate.edu/exss/index.html>> or go to the weblink for the Bone Research Lab at <<http://www.hhs.oregonstate.edu/exss/research/bone/index.html>>. Submit letter of application, vita, and the names and contact information of three people who can serve as references to: Dr. Jeff McCubbin, Associate Dean, College of Health and Human Sciences, Oregon State University, WB 120 Corvallis, OR 97331-3303, Phone: (541) 737-5921; FAX: (541) 737-4230; email: <[jeff.mccubbin@oregonstate.edu](mailto:jeff.mccubbin@oregonstate.edu)>. For full consideration: May 17, 2004. Appointment begins September 16, 2004 (negotiable)

### **HealthForce Rehabilitation seeks exercise specialist**

HealthForce Rehabilitation in Seattle is seeking an Exercise Specialist to assist physical therapists in an outpatient orthopedic clinic setting.

The position is 20 hours/week and we are looking to fill this spot as soon as possible. Duties will include the following:

Assist therapists by applying modalities and providing instructions to patients under the direction of therapist, and monitoring and instruction of patient exercise programs. Assist therapist with any other miscellaneous items (night splinting, taping, etc.)

Participation in program development/community involvement by developing or assisting in the development of patient based exercise programs or classes, including teaching/instruction wellness, fitness, and/or body mechanics classes to community groups. Also, assist therapist(s) with community injury screening programs, sports event coverage and school sports participation screenings.

Maintain facility in a presentable, professional manner to include: cleaning/stocking all treatment rooms including disinfecting surfaces which contact patient (pillow cases, treatment tables, hydrotherapy, etc.), cleaning, maintenance (oiling, tightening loose parts, etc.) and stocking of all equipment and therapy tools.

#### Qualifications

1. BS/Masters degree in Exercise Physiology, Exercise Science or athletic training
2. One-year internship/work experience in medical field a plus.
3. Excellent interpersonal and communication skills.

Anyone qualified and interested, please contact Leslie Kenney at 425-806-5729 or fax a resume to 425-806-5779.

### **PRO Sports Club seeks personal trainers**

PRO Sports Club, a world class private membership athletic club located in Bellevue, Washington, with over 20,000 members is currently seeking personal trainers to work along side physicians and dietitians in a medically based professional environment. Competitive applicants must have a 4-year degree in Exercise Science and be ACSM-H/FI certified. PRO Sports Club offers competitive wages, excellent benefits, and opportunities for advancement. Visit PRO Sports Club at <[www.proclub.com/jobs.htm](http://www.proclub.com/jobs.htm)> or call (425) 861-6202. EOE.

### **Summer school opportunity**

Western Washington University will offer two enrichment courses this summer: PE 445b Nutrition and Performance: Overview (1 credit) instructed by Lorrie Brilla, Ph.D., American College of Nutrition Certified Nutrition Specialist; and PE445d Storytelling and Sports (2 credits), facilitated by Lorrie Brilla and Jim Moore. See <<http://www.acadweb.wwu.edu/eesp/summer/images/CoursesWEB.pdf>> for a full description and registration information.

### **News from around the regions**

The Center for Healthy Living at Western Washington University has the directive of enhancing the health status of citizens in the Pacific Northwest region through education, research, and community collaboration by:

- Developing proactive strategies for improving quality of life through healthy lifestyles
- Focusing on disease and illness prevention activities
- Disseminating health-related information
- Conceptualizing new models for healthy/effective living

As a kick-off to achieve those goals, the Center for Healthy Living hosted a workshop, "Prevention Across the Lifespan" <<http://www.wwu.edu/depts/chss/PreventionAcrossLifespanWorkshop.htm>> on March 12-13, 2004, in Bellingham, Washington. The featured keynote was: "Physical Activity and Health" by Dr. Steven Blair, Cooper Institute, Dallas, TX. The opening keynote: "William Shakespeare's Advice for Healthy Living" was presented by Dr. Dan Tripps, University of Puget Sound, Tacoma, Washington.



Other keynote addresses were presented by: Dr. Lester Sauvage, Hope Heart Institute, and Dr. Jan Hillson, Virginia Mason Medical Center, both from Seattle, WA.

For more information on the Center's activities, see: <[http://www.wvu.edu/depts/chss/center\\_for\\_healthy\\_living.htm](http://www.wvu.edu/depts/chss/center_for_healthy_living.htm)> or email Dr. Kathy Knutzen, <[Kathy.Knutzen@wvu.edu](mailto:Kathy.Knutzen@wvu.edu)>.

### ***University of Oregon's Department of Exercise and Movement Science receives important grant***

Dr. John Halliwill, FACSM, and Dr. Christopher Minson, FACSM, of the Department of Exercise and Movement Science at the University of Oregon were awarded a \$250,000 grant from the Department of Defense to build an environmental chamber for the study of human integrative physiology. When completed, the 12'x12' room will be capable of controlling temperature between -10 to 50 degrees Celsius, humidity between 10% and 95%, and simulating altitudes up to 18,000 feet. The new facility will also be important for preparing graduate students for studying environmental stress. Construction of the environmental chamber is planned for this summer. The new facility will significantly enhance the research capabilities of the Exercise and Environmental Physiology Laboratories at the University of Oregon. The link to the EEP labs is: <<http://eeplabs.uoregon.edu>>.

### ***Northwest student receives highest award***

Brett Wong, M.S., a doctoral student in the Department of Exercise and Movement Science at the University of Oregon, was awarded the National Student Research Award by National ACSM for his project entitled "A Role for Histamine in Active Vasodilation". Wong's advisor is Dr. Christopher Minson, FACSM. The award is presented to the student with the most outstanding research project of the year, and is the most prestigious award given to a student by ACSM. Wong will receive complimentary registration to the Annual Meeting, complimentary hotel accommodations and meals, round-trip airfare, and tickets to the Annual Awards Banquet.

## ***NEWS from National ACSM***

### ***Make a difference on Capitol Hill***

ACSM recently acquired legislative tracking software that will allow the College to be even more active on Capitol Hill. This new technology will also aid ACSM staff in connecting members with their congressional representatives. In order to harness ACSM's full power and influence, we need members to join this volunteer grassroots effort. As legislative issues arise, ACSM will assist this group in contacting legislatures in the most appropriate and useful ways. To play a key role in ACSM's grassroots policy network, contact Jim Gavin, Staff Liaison to the Health and Science Policy Committee, Tel.: (317) 637-9200, ext. 117; e-mail: <[jgavin@acsm.org](mailto:jgavin@acsm.org)>.

### ***New Resume Review Service to be offered at upcoming ACSM Annual Meeting***

If you're a student looking for your first "real" job or a seasoned professional looking to make a move, be sure to take advantage of the new ACSM Resume Review Service. Simply drop off your resume at the ACSM Member Service Center in the Indiana Convention Center during the Annual Meeting on June 2-5, 2004 in Indianapolis. An ACSM member with experience in hiring will critique your resume and provide helpful suggestions for improvement. Comments will be forwarded to you two to four weeks after the meeting. If you have any questions regarding this new program, contact Heather Turner at <[hturner@acsm.org](mailto:hturner@acsm.org)>.

### ***ACSM releases exercise and hypertension Position Stand***

*Exercise is a major lifestyle modification needed to prevent, treat, and control hypertension*

INDIANAPOLIS – Exercise is the cornerstone therapy for the primary prevention, treatment, and control of hypertension, according to the new Position Stand–*Exercise and Hypertension* released on March 2, 2004 from the American College of Sports Medicine (ACSM). Adults with hypertension should seek to gain at least 30 minutes of moderate-intensity physical activity on most, if not all, days of the week, but they should be evaluated, treated, and monitored closely. The official ACSM pronouncement is published in the March 2004 issue of *Medicine & Science in Sports & Exercise*®.



Hypertension is a common medical disorder associated with increased risk of disease. It is the most prevalent cardiovascular condition found in recreational exercisers and athletes. Hypertension increases with age, and is higher in young men than in young women, although the reverse is true in older adults. Resting blood pressure (BP), family history, body mass index, and fitness level are known predictors of hypertension.

Exercise programs that involve endurance activities, such as walking, jogging, running, or cycling, coupled with resistance training, help to prevent the development of hypertension and lower BP in adults. Individuals with controlled hypertension and no cardiovascular or kidney disease may participate in an exercise program, although there is limited ability to forecast exercise BP and cardiovascular complications due to possible underlying clinical conditions.

A higher level of physical activity and fitness resulting from long-term (chronic) exercise training has a protective effect against hypertension; that is, fitter people with hypertension will have lower BP than those who are less fit. In addition, those with higher baseline BP levels will experience greater BP reductions from exercise. Even a single session (acute) exercise bout provides an immediate reduction in BP, which can last for a major portion of the day (up to 22 hours).

Older adults experience these same benefits, but the evidence is not clear in children and adolescents. ACSM indicates the rise in childhood obesity will likely lead to increased numbers of hypertensive children and adolescents.

Special considerations for exercise with hypertension include:

- The type, frequency and duration of activity are important. People with hypertension should exercise daily for 30 minutes or more at a moderate level to gain health benefits.
- People using medications, such as beta-blockers, should be cautious of developing heat illness when exercising. These medications and diuretics impair the ability to regulate body temperature.

- Adults with hypertension should extend the cool-down period of the workout. Anti-hypertensives, such as alpha blockers, calcium channel blockers, and vasodilators may cause BP to lower too much after abruptly ending exercise.
- Overweight and obese adults with hypertension should combine regular exercise and weight loss to effectively lower resting BP.

Promoting the BP-lowering effects of single exercise sessions may best motivate people to exercise. Physicians are encouraged to promote the role of exercise in controlling BP to their patients.

- \* A physician evaluation and clearance is necessary for those with severe or uncontrolled BP prior to beginning an exercise program. Higher risk patients (such as those with coronary artery disease or chronic heart failure) should lessen the intensity of their training program.

The paper acknowledges both neural and vascular changes resulting from chronic and acute exercise contribute to decreases in BP, and that there may be a genetic link between these types of exercises and the BP-lowering effects.

ACSM's guidelines support those proposed by the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure, which advocate earlier detection and aggressive treatment as a way to control hypertension-related death and disease and feature a "prehypertension" category to measure BP.

*Exercise and Hypertension* replaces ACSM's 1993 Position Stand, *Physical Activity, Physical Fitness, and Hypertension*.

For a complete copy of the Position Stand, visit ACSM online at <[www.acsm-msse.org](http://www.acsm-msse.org)>. To speak with a leading sports medicine expert on the topic, contact the Department of Communications and Public Information at 317-637-9200.



## Book Review

### ***Enhancing Recovery: Preventing Underperformance in Athletes***

Michael Kellmann, PhD

Human Kinetics, Champaign, IL, 2002

Effective recovery is essential for successful adaptation to high training loads. Rather than focusing on overtraining, *Enhancing Recovery, Preventing Underperformance in Athletes* explores the science behind underrecovery and its implications on performance detriment. Kellmann has focused his attention on recovery as a fundamental part of training and discusses how underrecovery is a precursor of overtraining. *Enhancing Recovery* takes a unique approach by addressing multiple factors from an interdisciplinary point of view. The author takes the position that medical, psychological, physiological, environmental, and coaching issues should be equally assessed when examining the athlete's ability to adapt to physical training. This approach to the challenge of recovery is invaluable to the coach and athlete striving to achieve balance to the workload of intense physical training.

Kellman opens the four-part text with a section dedicated to conceptualizing the problem of underrecovery. A thorough review of the classic terms and basic science behind the stressors leading to overtraining defines overtraining as "a syndrome that results when excessive, usually physical, overload on an athlete occurs without adequate rest." The excessive overload placed on the athlete without substantial rest leads to decreased performance and the inability to successfully adapt. Expanding on this foundation, Kellmann binds the gap between proper recovery and prevention of overtraining. Subsequent chapters thoroughly explain active and proactive enhancement of recovery.

Kellmann points out the determinants of underrecovery and cites that the aim of training is to provide successive stressors that will dislodge the athlete's homeostasis and provide a stimulus to begin adaptation. A proper sequence of events following a given training load should include fatigue, recovery, and supercompensation to eventually outshine the initial performance level. Classification of the "training

load" provides us with the resources to quantify and track an athlete's progress, aiming to maximize performance at specific times. Monitoring heart rate, iron, glycogen, plasma glutamine and glutamate, immune function, and hormonal markers of training tolerance are examples he explains for monitoring tolerance to training and minimizing the risk of fatigue and illness.

The text is complete with peer reviewed background information supporting the physiology and psychology of training with optimal recovery. Unlike many training texts, this book assesses the problem with an interdisciplinary approach in which the author describes the challenge of training adaptation to involve the wide spectrum of people engaged in an athlete's training program. Professionals from a variety of disciplines are working together on this problem, pooling their specialties to uncover contributing factors and collective conclusions. In the end, the athlete wins because of the holistic method in which Kellmann has blended the different areas of expertise.

*Enhancing Recovery: Preventing Underperformance in Athletes* is dedicated to the enhancement of recovery in sport for training adaptation to occur at an optimal level. With an overall emphasis on recovery and health, this book serves not only to improve performance but quality of life. Coach and athlete need to be equally aware of the importance of optimal recovery in the prevention of illness, injury, and burnout.

The text is written for readers with a basic understanding of scientific principles and most students, coaches, and athletes will find it accessible and truly helpful. This book is a great addition to literature evaluating the problem of underrecovery as a precursor to overtraining and it facilitates understanding at a level wedged between popular sources and published research journals.

—Jay Williams

Graduate Teaching Fellow in PARS Fitness and Exercise Physiology  
University of Oregon



### ***The Unstable Ankle***

Nyska, M., & Mann, G., eds.  
Human Kinetics, 2002, 305 pp.

Despite the clinicians' familiarity with the ankle sprain, a fully synthesized multidisciplinary approach to ankle injury remains elusive. From subtalar biomechanics, to surgical procedures, editors Nyska and Mann have compiled a complete reference for the most commonly injured joint in sports.

Topics progress from a thorough examination of foot and ankle structure and function to physical and radiological evaluations. Just when the topic seemed straight forward, eight further chapters highlight the complications of ankle sprains. A five-chapter section dealing with conservative management is followed by a half dozen chapters detailing operative procedures. The text concludes with additional chapters focusing on injury prevention.

The diversity of the authors' backgrounds is impressive. There are contributions from physical therapists, researchers, orthopedic surgeons, and medical doctors. The text stresses the role of allied health care professionals in conservative management. Rehabilitation strategies emphasize a medical team approach and seek to minimize the physical and financial cost to patients.

Seven grading systems of injury severity are provided and serve as an example of the depth of coverage appearing in the text. Three systems are anatomically based, three are based on the clinical presentation of symptoms, while the final system is designed for outpatient use.

A discussion of scoring systems precedes the diagnostic imaging chapters. The Ottawa guidelines for ordering ankle radiographs are included, in which pain near the malleoli, or on their posterior borders, and an inability to bear weight each warrant x-ray exam. The x-ray views for diagnosis are specified, as are the application of MRI and CT imaging. The final chapter of this section details the role of arthroscopy in chronic ankle sprains.

The prevention section begins with this quote, "as in any field of medicine, the real heroes are not the emergency room doctors, the real heroes are those who prevent illness." Here the reader encounters the chapters, "ankle instability in children and adolescents", "prevention of acute ankle ligament sprains in sport", and "preventing ankle injuries in parachuting". Tables and figures of the highest quality add clarity to the discussion, as they do throughout.

The Unstable Ankle provides the clinician or student with the means to develop a comprehensive approach to ankle injury. I'm glad to have it on my desk.

David Mandeville, M.S. ATC. Graduate Teaching Fellow  
Exercise and Movement Science, University of Oregon

### ***Musculoskeletal Trauma: Implications for Sports Injury Management***

Delforge, Gary  
Human Kinetics, Champaign, IL, 2002, 250pp.

In *Musculoskeletal Trauma: Implications for Sports Injury Management*, Delforge explains the underlying processes of tissue injury, regeneration, and how modalities influence the healing process.

He begins the book with a review of tissue structure and then goes into further physiological explanations of hemorrhage and hemostasis with regards to injured tissue.

The next section of the book focuses on tissue repair and the influence of therapeutic interventions on the tissue. Delforge begins with soft tissue repair and moves on to bone healing, including therapeutic interventions for both soft tissue and bone. The book then moves on to explain proprioceptive and sensorimotor deficits and how rehabilitation can influence each of them. The final section of the book is devoted to sports injury management. The chapters include how to assess an injury, how to identify a problem, how to treat an injury and how to plan a rehabilitation program.

Anyone interested in the health field, specifically people interested in sports medicine, would benefit from reading this book. This book would complement any undergraduate program related to physical therapy, athletic training, and occupational therapy. Delforge does a wonderful job explaining the physiological effects an injury has on tissue and how different therapeutic interventions would influence the healing process.

*Musculoskeletal Trauma: Implications for Sports Injury Management* provides a great physiological explanation for tissue injury, regeneration, and how therapeutic interventions contribute to the tissue healing process. This book is a great learning tool that will help individuals defend how and why they are choosing to treat an injured tissue.

Gail Schmalz, Graduate Teaching Fellow,  
Department of Exercise and Movement Science, University of Oregon



## *Graduate Students, preserve your thesis or dissertation with Kinesiology Publications University of Oregon*

Kinesiology Publications (KinPubs) will preserve your thesis or dissertation on microfiche, still the safest long-term archival medium available. This is a free service.

KinPubs will also create a pdf file of your study for speedy electronic distribution to academic libraries and scholars who would like to know about your research. Your study will be accessible and will more likely remain a discussion point in the area of your research. It will also be included in the SportDiscus index. Please check <<http://kinpubs.uoregon.edu>> for more information.

Graduate students should contact Dr. Michael Powell at <[kinpubs@uoregon.edu](mailto:kinpubs@uoregon.edu)>, (541) 346-0932, to inquire about the submission process.

---

Graduate advisors of academic departments are encouraged to establish a submissions procedure for inclusion of student work into the Kinpubs collection. Please contact Dr. Henriette Heiny <[hheiny@uoregon.edu](mailto:hheiny@uoregon.edu)>, or Dr. Michael Powell at <[kinpubs@uoregon.edu](mailto:kinpubs@uoregon.edu)>, (541) 346-0932 to learn more about the benefits of this free service.

---

Academic libraries can subscribe to the collection to receive either microfiches on a regular basis or unlimited access to the electronic files. Individuals may download pdf-held theses for a reasonable fee. Go to <<http://kinpubs.uoregon.edu>> and select: Search the Collection.

## *Theses and Dissertations*

Below is a list of in-progress or completed doctoral dissertations and master's theses in the Northwest region of which we learned since the 2003/4 winter newsletter.

Graduate advisors, please contact us about a study in preparation as soon as the work takes final shape. Please send an E-mail notice to Henriette Heiny, <[hheiny@uoregon.edu](mailto:hheiny@uoregon.edu)>.

### *Oregon State University*

#### **Ph.D. Dissertations**

Objectified Body Consciousness: A theory-to-practice approach. Deborah H John. Advisor: Vicki Ebbeck (December 2003)

Accuracy of momentary time sampling: A comparison of varying interval lengths using SOFIT. Jeff McNamee. Advisor: Hans van der Mars (December 2003)

Water exercise effects on bone density and fall risk in postmenopausal women. Tanya Littrell. Advisor: Christine Snow. (February 2004)

#### **Master's Theses**

Contribution of selected muscles to the dynamic stability of the medial aspect of the elbow. Charles Leddon. Advisor: Rod Harter (December 2003)

Effectiveness of classroom vs. webbased lifetime fitness for health lab instruction on college students behavioral and psychological physical activity orientation. Marc Spaziani. Advisor: Brad Cardinal (December 2003)

### *Montana State University*

#### **Master's Theses**

A comparison of training methods for enhancing climbing performance. Colin Davis. Advisor: Dan Heil (Spring 2004)



## 2004 NWACSM Chapter Officers

Dan Heil, Ph.D., President  
Department of Health & Human Development  
Hoseaus 101  
Montana State University  
Bozeman, MT 59717-3360  
Ph. (406) 994-6324  
E-mail: dheil@montana.edu

Peter Harmer, Ph.D., Immediate Past President  
Willamette University  
Dept. of Exercise Science and Sports Medicine  
900 State Street  
Salem, OR 97301  
Ph. (503) 370-6470  
E-mail: pharmer@willamette.edu

Christopher Minson, Ph.D., President-Elect  
Department of Exercise and Movement Science  
1240 University of Oregon  
Eugene, OR 97403-1240  
Ph. (541) 346-4105  
minson@oregon.uoregon.edu

Stasinos Stavrianeas, Ph.D., Treasurer  
Assistant Professor of Exercise Science  
Willamette University  
900 State St.  
Salem, OR 97301  
Ph. (503) 370-6392; Fax (503) 370-6379  
E-mail: stas@willamette.edu

Trish Root, M.S., Secretary  
Coordinator, Physical Education Department  
North Seattle Community College  
9600 College Way North  
Seattle, WA 98103  
Ph. (206) 528-4593; Fax (206) 527-3715  
E-mail: troot@sccd.ctc.edu

Toms Wells, PED, FACSM, Regional Chapter Committee Representative  
409 SW 186<sup>th</sup> St  
WCPPA  
Normandy Park, WA 98166  
Email: ward\_w@comcast.net

Michael Porter, M.S., Member-at-Large, 03-06 (Fitness)  
7680 DSW Gearhart Dr.  
Beaverton, OR 97007  
Ph. (503) 350-3915  
E-mail: michejp@msn.com

Steven Gaskill, Ph.D., Member-at-Large, 02-05 (Research)  
University of Montana  
Dept. of Health & Human Performance  
112 McGill Hall-HHP  
Missoula, MT 95812  
Ph. (406) 243-4211  
E-mail: steven.gaskill@mso.umt.edu

Janet T. Peterson, DrPH, RCEP, CHE,  
Member-at-Large 04-07 (Clinical)  
Assistant Professor  
Exercise Science, Health, Human Performance & Athletics,  
Linfield College  
Portland, OR

Stephen B. Conant, Regional Student Representative (04-06)  
Montana State University  
1530 South Grand Ave  
Bozeman, MT 59715  
Phone: (406) 581-5545  
Email: steveconant@hotmail.com

Sarah Durkee, National Student Representative (03-05)  
Student, Gonzaga University  
MSC #1196  
Spokane, WA 99258  
E-mail: dancequeen888@yahoo.com

Home Office:  
Wendy Repovich, Ph.D., FACSM,  
Eastern Washington University  
PEHR Dept., PEB 200  
Cheney, WA 99004  
Ph. (509) 359-7960; Fax: (509) 359-4833  
E-mail: wrepovich@ewu.edu  
<http://northonline.northseattle.edu/nwacsm/>

Newsletter Editor  
Henriette Heiny, Ph.D., FACSM  
Int'l Institute for Sport and Human Performance  
1243 University of Oregon  
Eugene, OR 97403-1243  
Ph. (541) 346-4114; Fax (541) 346-0935  
E-mail: hheiny@uoregon.edu

2004 Annual Meeting Coordinator  
Dennis Dolny,  
Interim Director, Health, Physical Education, Recreation & Dance,  
University of Idaho  
Moscow, ID  
Phone: (208) 885-2188  
Email: ddolny@uidaho.edu



## 2004 Northwest American College of Sports Medicine Membership Form

Name: \_\_\_\_\_  
                    First                    Middle                    Last

Date of Birth: \_\_\_\_\_

Mailing Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Home Phone (     ) \_\_\_\_\_

Business Phone (     ) \_\_\_\_\_

Fax: (     ) \_\_\_\_\_

E-mail: \_\_\_\_\_

Occupation: \_\_\_\_\_

Highest Degree Earned: \_\_\_\_\_

Are you a member of the national ACSM? \_\_\_\_\_

Your ACSM member no. \_\_\_\_\_

If yes, check any that apply

- Professional
- Professional-in-Training
- Associate Member
- Undergraduate Student
- Graduate Student

Chapter membership category and yearly dues

- Professional ACSM member (\$30)
- Professional ACSM nonmember (\$45)
- Student (\$15)
  - Undergraduate Student
  - Graduate Student

Mail this form and a check made out to NWACSM to:

**NWACSM Home Office**

Eastern Washington University, PEHR Dept., PEB 200  
Cheney, WA 99004  
Ph. (509) 359-7960; Fax: (509) 359-4833  
E-mail: wreprovich@ewu.edu

### Northwest Chapter American College of Sports Medicine

Wendy Repovich, Ph.D., FACSM  
Physical Education, Health & Recreation Dept..  
Eastern Washington University  
200 Physical Education Building  
Eastern Washington University  
Cheney, WA 99004-2476

Nonprofit  
Organization  
U.S. Postage  
PAID  
Eastern  
Washington Uni-  
versity

ADDRESS SERVICE REQUESTED