

2-1998

Human Performance Lab Newsletter, February 1998

St. Cloud State University

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St. Cloud State University, "Human Performance Lab Newsletter, February 1998" (1998). *Human Performance Lab Newsletter*. 11.
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NEWS

ST. CLOUD STATE
UNIVERSITY
A tradition of excellence and opportunity

Department of Health, Physical Education, Recreation, and Sport Science
Phone: (320) 255-3105

February 1998

KELLY'S CORNER

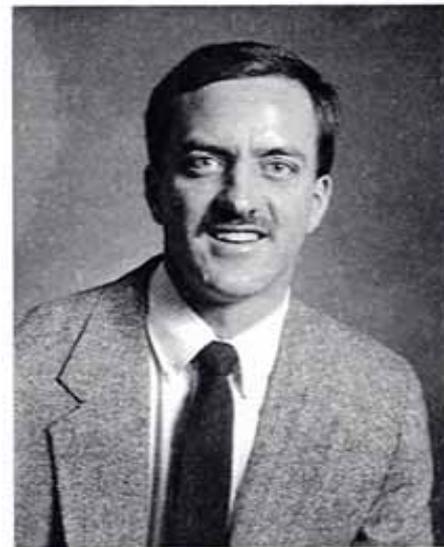
By Dr. David Bacharach

Albeit a little bumpier, we're learning to operate without Jack. Like young birds unsure of their wings, we're learning to fly, and we'll continue the directions Jack provided for us. As strange as it is not to see his smiling face each day, it's nice to know Jack left us with few things to worry about. Our students continue to amaze us in quality and quantity. We have no shortage of bright, energetic people to work with.

I personally, am excited about getting to spend more time with people coming through the Adult Fitness Program. So far it's been a nice mix of familiar faces and new ones. I can't help wondering, however, if we are reaching out far enough with our message of good health through a positive and active lifestyle. Physical activity appears to be a greater part of many people's lives; yet, the Surgeon General's report indicates that 60 of U.S. adults get no exercise or are infrequent exercisers at best. A true 25 are totally inactive (mouse potatoes, in the current vernacular). Perhaps we'll never reach that group, but there's hope for the others. (I'm sure they've felt the "good" that each activity provides.) It doesn't take much movement to feel the warmth of renewed circulation, the relaxed feeling of a good stretch, or for some the exhilaration of breaking a sweat. Many people chase youth with unparalleled vigor. Why don't we chase health with that same zeal? A quote by Lester Breslow, M.D. that hangs in our lab may say it best, "It's what you do hour by hour, day by day, that largely determines the state of your health; whether you get sick, what you get sick with, and perhaps when you die." I hope you agree and that we each make a commitment to ourselves to stay active. This is Dr. B from Kelly's Corner wishing all a wonderful year.

Welcome Dr. Seifert

We are pleased to introduce you to our new faculty member in the Human Performance Lab, John Seifert, Ph.D. He attended Boise State University in Idaho majoring in exercise physiology. He received his M.A. degree at Miami University in Oxford, Ohio. Dr. Seifert then spent four years at the Gatorade Exercise Physiology Research Laboratory in Barrington, Illinois, conducting research and giving presentations to professional groups. In August, 1990 he went to The University of Utah in Salt Lake City to peruse his Ph.D. in exercise and human physiology. While at the University, he served as the



head exercise physiologist for the cross country and alpine ski teams. He was project director of a research team studying the effects of fluid balance and altitude with skiers and hikers and assisted with the dry land training program and fitness testing for the U.S. Ski Team. He also worked for Specialized Bikes researching mountain bike suspension. Prior to coming to SCSU, he was a professor at West Liberty State College in West Virginia for two and a half years. Research continued in WV as he studied the effects of exercise in the heat on acclimation rates for women and ad libitum fluid ingestion during recreational century bike rides.

He is currently seeking funding for grants relating to carbohydrate studies, lactic acid kinetics and maintaining cell membrane integrity. In addition to teaching, research and advising students, he also works with various SCSU athletic team's conditioning and training programs.

On a personal note, Dr. Seifert was born and raised in Mankato, MN. His wife, Mary, is from Medford, Oregon, and they have three daughters; Lindsey, Katie and Olivia. Dr. Seifert believes that there are three seasons in life: skiing, fishing, and hunting.

HEALTH NOTES

What is the 40-30-30 Diet? Is It Better than the Typical

By Debbi Pauison

One of the new diet fads this year is the Personal Record (PR) 40-30-30 diet; 40 carbohydrates, 30 proteins, and 30 fats. There are numerous testimonials on the effectiveness of the 40-30-30 diet from celebrities and athletes whether it be for weight loss or improved sports performance. The PR Nutritional Program is a departure from the popular high carbohydrate, low fat approach to weight control. The purpose of the PR program is to burn more stored body fat by moderating carbohydrate intake. PR Nutrition Inc. claims their diet is better because other programs fail to address the connection of hormonal responses to the food we eat.

Therefore, providing the body with the near equal amounts of carbohydrates, proteins, and fats will enable the body to access stored body fat for energy. This should then result in fat loss without sacrificing lean muscle mass.

To date, no scientific research has supported the effectiveness of the 40-30-30 diet. Most professional health groups in the country recommend a diet consisting of 55-65 carbohydrates, 10-15 protein and 20-25 fat. According to Ellen Coleman, R.D., M.A., M.P.H. (Physician and Sports Medicine 1997; 25 (2):97-98.), high carbohydrate diets have often been deemed negative because high amounts of carbohydrates can raise blood sugar levels causing the release of insulin. As insulin levels increase, free fatty acid mobilization decreases. However, any circulating fat along with extra carbohydrates is encouraged to be stored. Eating a diet high in carbohydrates will not make a person fat. Weight gain or loss depends more on how many calories one takes in compared to how many calories one expends. When people are encouraged to eat a low fat diet, they often consume extra portions of low fat foods resulting in no weight loss.

Ultimately it is a matter of energy balance. During exercise, fat becomes available after about 20 minutes. Many people aren't active long enough to burn significant amounts of fat. A second concern for athletes considering the 40-30-30 diet may be that it is not very effective for high intensity exercise levels. Carbohydrates are needed for an individual to perform at his or her best. Eating adequate carbohydrates is essential to maintain muscle stores of glycogen. So, the bottom line with the 40-30-30 diet is this: 1) too many calories from any food source can result in weight gain and 2) inadequate carbohydrates may take the energy out of your high intensity activity.

Dietary Supplements: Can They Improve Exercise Performance?

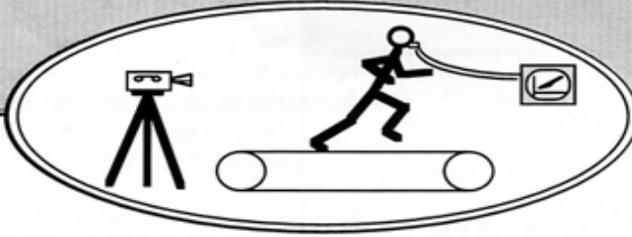
By Kira Camp

Hundreds of dietary supplements are marketed today with claims of improving exercise performance and/or health. Claims such as improved strength, energy, power, endurance, fat loss and muscle gain appeal to a wide variety of buyers. Supplements have grown into a multibillion dollar industry. Unfortunately, many supplements are not scientifically tested or FDA approved. Often times a product's effectiveness is advertised through personal testimonials, paid endorsements and patents. These are not reliable sources. Properly controlled research is key in determining a product's effectiveness and safety. One of the "hottest" supplements on today's market is creatine.

Several studies have examined the effects of creatine supplementation on exercise performance. Creatine is a nitrogenous organic compound which is obtained primarily from meat and fish. Normal intake is one gram per day for people consuming a mixed diet. Creatine is also synthesized by the body at a rate of one gram per day, which adequately maintains normal levels. The primary function of creatine is to act as a buffer against rapid increases in energy requirements. Phosphocreatine, creatine with a phosphate group attached, acts as a reserve energy store to be used during short bursts of high-intensity exercise. Once used, it can replenish itself more rapidly than other energy stores. Thus, the rationale for supplementation is to increase muscle creatine levels in order to enhance performance in repeated bouts of short-duration, high-intensity activities.

Although research results have been mixed, some generalizations can be made about creatine supplementation and performance. Studies have shown that the beneficial effects of creatine supplementation are suitable for a limited number of exercise modalities and intensities. Exercises dependent on phosphocreatine as an energy source such as weight lifting, football, and hockey, are more likely to be enhanced. Elevated creatine stores do not appear to be beneficial for endurance activities, which primarily rely on oxidative energy sources.

More research is needed to determine the long term effects of creatine on exercise performance and health. Until then, consuming a balanced diet of wholesome natural food from the Food Guide Pyramid is still the recommended way to meet dietary nutritional needs.



Super-oxygenated water?

By Dr. John Seifert

In the race to gain market control of the bottled water industry, it was just a matter of time before a company introduced water with added oxygen. Life 02 International recently granted a research project here in the lab to test the effects of super-oxygenated water on cycling performance. Oxygen, at 50 ppm, is dissolved in water in the hopes of enhancing oxygen transport to the tissues. One previous study with this product was performed on healthy, untrained subjects. Results indicate that 83 of the runners improved their times during 5-km runs. Our study will use eight highly trained cyclists. Each cyclist will ride under a placebo and an experimental condition. The project will be conducted in a double blind fashion. Data collection is set to begin in late January and should take about a month to complete. The protocol requires the cyclist to complete an hour of steady state exercise at about 75 V02max. This steady state ride will be followed by a short time trial, 5 km, for the performance task. Drink up! You never know what will work!

Other projects in the lab that are on my drawing board for this year include: work with phosphatidyl serine ingestion and membrane integrity, the influence of carbohydrate feeding and duathlon performance, and carbohydrate gel ingestion and mountain bike performance. As with any of our projects, feel free to drop in or give me a call, and I'll be happy to keep you updated.

e-mail to: jseifert@stcloudstate.edu

Eliminating the Bounce

Dr. Glenn Street

If identical twins completed in a vertical jump contest, which twin would win? Both twins start in the same slightly crouched position, one dips quickly before thrust up while the other twin thrusts up without preliminary countermovement (dip). Answer: the twin performing the jump with a countermovement will jump 15-30% higher because the muscles were prestretched during the preliminary countermovement. The prestretch allows the muscles to produce larger forces when they shorten during the upward thrust.

This small but quick bounce (countermovement) is such an advantage to us that it can be found in nearly every daily and sport activity. For example, when we bench press a heavy barbell we have learned to prestretch the muscle by quickly dropping the barbell a few inches toward our chest before pressing it up. Or when climbing stairs we have a little bounce in each step as we prestretch the calf muscles.

We have noticed in class demonstrations that students find it difficult to completely eliminate the countermovement from a squat jump, since the countermovement is a skill they have refined since early childhood. The students who are effective at minimizing or eliminating the countermovement seem to lose considerable height in the squat jump while those who retain a small but quick countermovement tend to approach their normal jump heights. A group of seven undergraduate, four graduate and two faculty members have teamed up to use a force platform and motion analysis system to see if the amount of countermovement during the squat jump is related to jump height.

Research Publications

Szmedra, L. and D.W. Bacharach. "Effect of music on perceived exertion, plasma lactate, norepinephrine and cardiovascular hemodynamics during treadmill running." International Journal of Sports Medicine, 18, 1997, 1-7.

Seifert, JG, MJ Luetkemeier, AT White, & LM MIno. "Influence of beverage ingestion on physiological responses in nordic skiers." Canadian Journal of Applied Physiology. (In Press)

Seifert, JG, MJ Luetkemeier, MK Spencer, & DJ Miller. "The effects of mountain bike suspension systems on energy expenditure, physical exertion, and time trial performance." International Journal of Sports Medicine. 3(18): 197-200.

Burke, ER and JG Seifert. "How Cold Weather Affects Your Food and Fluid Needs." The Ski Patroller. Winter, 1997.

Burke, ER and JG Seifert. "Drink Up! The Importance of Staying Hydrated While Skiing." The Official Publication of the Professional Ski Instructors of American Education Foundation. Fall, 1997.

Meet the New Graduate Students

Jason Lahr is from Avon, MN. He graduated with a B.A. in biology and a minor in psychology from St. John's University. Jason has spent time volunteering at several physical therapy clinics in the St. Cloud area. He loves sports and the outdoors. If he is not in the gym working out, you will likely find him out on a lake either fishing or water-skiing.

Keli Holmes is originally from St. Joseph, MN. She received her B.A. in biomedical sciences from SCSU. Keli also was a member of the women's Soccer Team for four years at SCSU. When not at school or work, Keli enjoys spending time outside with her new fiancé" and watching "The Simpsons".

Shannon Ready now lives in Edina, MN after graduating from St. Olaf College with a double major in biology and women's studies. She also spent two years at Lewis and Clark College in Portland, OR where she enjoyed hiking, climbing and camping in the mountains. Shannon is the assistant coach for the SCSU Women's Nordic Ski Team. She has competed in road races, triathlons, mountain bike races, and equestrian jumping events. Hobbies include backpacking, big dogs and kickboxing.

Congratulations!

The faculty and staff at the Human Performance Laboratory would like to acknowledge and congratulate the exercise science graduate students who completed their thesis work and earned a Master of Science degree in 1997:

Robyn Abear Joseph Vardas
Jamie Jerdee Dean Stutz,
Tyier Gibson Ben Noonan
Wendy Brown Rosalie Hayenga
Larry Wallner
Wm. Sean Goldsworthy

Aaron Nelson is from Austin MN. He graduated with a B.A. in psychology and a minor in philosophy from SCSU in 1996. He worked in special education at Sartell High School last year. He has been Sartell's Assistant Varsity Volley ball coach and head Women's Nordic Skiing coach for the past two years. He is currently competing on the SCSU men's club volleyball team.

Michelle Walz is originally from Coon Rapids, MN. She received her B.A. in biomedical science from SCSU. Michelle also was and is currently an aerobics instructor on campus. She especially enjoys aerobicing. After graduating, she and her husband, Brent, spent a year in Japan. In her free time, she enjoys the outdoors by hiking, biking, camping and backpacking

FINANCIAL SUPPORT

We greatly appreciate the financial support many of you have provided over the years. The money has been instrumental in helping the Human Performance Laboratory's programs. We are always so gratified to know that you believe in our work enough to personally invest in it.

Should you be in a position to make a contribution to the Human Performance Laboratory, please make checks payable to:

SCSU Foundation
Adult Fitness Account
St. Cloud State University
Alumni & Foundation Center
720 4th Avenue South
St. Cloud, MN 56301-4498

OUR GRATITUDE!

The staff and students at the HPL would like to thank the following people for their contributions to the Adult Fitness Program in 1997:

Karen Askim
Alien and Mary Andreotti
David and Nancy Bacharach
Carol Brink
Ron and Mary Beth Cochran
Ray and Phyllis Collins
Dennis and Anne Fields
James and Marcella Gammell
Curtis and Betty Ghylin
Earleen and Abdalla Hanafy
Lee and Marlene Kasper
John and Doris Kelly
Louis Krippner
David and Barbara Kunze
Tom and Mille Lembeck
Ruth Nearing
Harry Olson, Jr.
Sherwood and Carol Reid
Judith M. Seitz
Les and Eva Sova
Glenn and Nancy Street
Dean Stulz
Betsy Swenson
Stephen and Elaine Thruene

Come on Down!

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THESIS WORK IN PROGRESS...

Assessing the CPX EXPRESS Respiratory Gas Exchange System Using IViale Athletes by Amy Keranen

My thesis project consists of assessing the CPX EXPRESS respiratory gas exchange by the Medical Graphics Corporation of St. Paul, MN. The CPX EXPRESS is an oxygen uptake system that Medical Graphics plans to market to sports medicine clinics and physicians. The reliability and validity of the CPX EXPRESS is being tested against a manual reference method. Well-conditioned male athletes performed a maximal graded treadmill exercise test to fatigue while expired gases were collected by the CPX EXPRESS. Each subject performed two tests, and the results between the two testing times will be compared for reliability and validity purposes.

A Kinetic Comparison of the Volleyball Spike Jump Performed on Hard Court and Sand Surfaces by Joel French

This is a study of the sand volleyball spike jump. The purpose of this study will be to examine the differences in vertical jump height, force production over time (impulse), and selected kinematic (video) characteristics of jumpers performing volleyball spike jumps from hard-court and sand-court surfaces. These variables will be collected from groups of "skilled" and "less skilled" sand jumpers in order to determine what makes some jumpers more proficient in the sand.

Ovulation Surge and its Effects on Plasma Volume and Performance in Females by Kelli Fordham

My thesis project is focused on the ovulation surge and its effects on plasma volume. This is a fairly unresearched area. Hopefully, this research to determine the effects of the menstrual cycle on exercise performance will stimulate further research in this area.

Relationship Between Aerobic Fitness and Physiological Reactivity to a Mental Stressor by Kira Camp

It has been hypothesized that regular exercise can help alleviate mental stress and some of its negative effects. A high level of mental stress, especially for prolonged periods of time, is associated with a variety of health risks such as hypertension, cardiovascular disease, high cholesterol, ulcers and migraine headaches. Various studies have looked at exercise as a key component in controlling physiological responses to mental stress. There is a prevailing hypothesis that individuals with a higher level of fitness have a lower physiological response to mental stress than do unfit counterparts. The aim of this study will be to test this hypothesis.

Deep Water Running for Maintenance of V02 Max and Aerobic Endurance

by Kirk Lewis

Being a non-weight bearing activity, deep water jogging has become a popular training alternative for both injured athletes and the general population. Deep water jogging involves the use of a flotation belt or vest to keep the subject's head out of the water. Although there have been many studies focusing on the differences between on-land vs. deep water running, few concentrate on the training and/or maintenance of cardiovascular fitness. The object of my study is to determine if 3-4 weeks of deep water running is sufficient enough to maintain cardiovascular fitness.

High Intensity vs. Traditional Strength Training by Kirk Olsen

My master's thesis involves the comparison of two forms of resistance training. One method is what strength training coaches/professionals refer to as High Intensity Strength Training and the other method follows a more traditional approach. I presently have 26 athletes participating in 10 weeks of training. My test subjects are currently entering their fifth week of training. Final results and conclusions are expected to become available in April of 1998.

Recovery Times and Repeated 5K Run Performances by Chris Haukos

My thesis topic is still in the making. It will most likely be the effect of recovery times on 5K running performance. This will allow racers to be more aware of recovery times needed to perform in back-to-back races, such as those at road races or long distance team events.

The Effect of the Breathe Right Nasal Strips on Lactate Threshold During Steady State Running by Deb Paulson

Breathe Right nasal strips have received much attention in the last few years in the area of sports performance. Many athletes are using *Breathe Right* nasal strips to try to enhance performance. Although much research has been done on *Breathe Right* nasal strips and short bouts of high intensity exercise, there are few studies addressing the effects of *Breathe Right* nasal strips on endurance type activities. The purpose of this study is to determine if an individual can run at a lower lactate level during steady state for 30 minutes while wearing a *Breathe Right* nasal strip.

INTERNSHIP EXPERIENCE

By Joel French

Exercise science graduate students at St. Cloud State are required to complete a three to six credit internship prior to graduation. The exact type of internship is left up to the students. In the past, students have done internships involving cardiac rehabilitation and exercise testing in a hospital setting, strength and conditioning for athletic teams, working with speed and power training through Acceleration Minnesota and/or designing athletic / medical equipment for companies such as Nike and Medical Graphics.

I recently completed my internship at the U.S. Olympic Training Center in Lake Placid, NY. I spent three months working with the athletes at the Training Center and working on research projects for the Olympic Committee. My involvement with the athletes consisted primarily of performing physiological tests in order to assess their performance as well as the effectiveness of their training programs over time. This testing included evaluations of the athlete's body composition, aerobic capacity, lactate threshold, strength and power. In order to get accurate and sports specific data, many of the tests were performed in somewhat unique settings: taking blood for lactate profiles from rowers, boat-to-boat, while they were on the lake training; taking blood samples and heart rates from biathletes while they were skiing and shooting on the range; and filming ski jumpers during a competition on a rainy day from the edge of a rocky 120 meter hillside.

The typical laboratory tests now seem almost easy in comparison. I was also given an opportunity to work on several research projects during the internship. These included a biomechanical analysis of the U.S. ski jumpers in order to determine the effectiveness of a new type of jumping platform for training, the effects of different skiing techniques on blood and muscle oxygen desaturation and muscle activation in elite cross-country skiers and the effects of a training program on oxygen desaturation in junior alpine skiers.

Working with the athletes and staff at the training center was an incredible experience. I was amazed at the dedication of the athletes, especially considering the intensity of their training. I was also amazed with the planning and precision involved in improving the athletic performance of an elite athlete. It is obviously a much greater challenge to improve the performances of these athletes than it would be the average athlete or individual. The staff at the training center provided a group approach to training. The departments of Sports Medicine, Sports Science and Technology, Sports Psychology and Nutrition all worked in concert to ensure the continuing success of the athletes. This is an essential approach with top level athletes.

The experiences I had through my internship at the Training Center have added immeasurably to the education which I have received at St. Cloud State.

