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Human Performance Lab Newsletter, February 2001

St. Cloud State University

HUMAN PERFORMANCE LAB
SPIRIT BODY MIND
ST. CLOUD STATE UNIVERSITY

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 2001

Inside this issue:

Laughter and Longevity

Laughter has been called "inner jogging." That's because it is a real workout, causing the muscles of the abdomen, chest, and shoulders to contract, and temporarily raises heart rate, respiration rate, and blood pressure. Afterwards, muscles are more relaxed than before, and heart rate and blood pressure dip below normal.

Coupon

Special Offer

50% Discount

Present this coupon at your next fitness evaluation and receive a 50% discount.

Boomeritis

What is "boomeritis"? If you thought boomeritis was a fictional word made up by someone with too much time on his or her hands, you are not alone. The American Academy of Orthopedic Surgeons (AAOS) has defined the growing number of sports injuries among baby boomers as boomeritis. The majority of the sport injuries suffered by baby boomers can be classified as either general joint damage resulting from wear and tear, or overuse injuries including torn muscles, tendons, and ligaments.

In addition to the loss of strength and endurance that occurs with aging, baby boomers undergo reduced circulation and hormone secretion over time. These changes ultimately cause an increase in reaction time, a decrease in joint lubrication, and reduced elasticity of muscles, tendons, and ligaments. Baby boomers often run into problems when they try to do the same things at age fifty that they did when they were twenty years old.

By acknowledging the increase of sport injuries among baby boomers, the AAOS is not trying to dissuade people from exercising. Instead, it is quite the opposite. It is a known fact that a sedentary lifestyle is more of a health risk than most injuries resulting from improper workout technique. The aim of the AAOS is to make baby boomers realize that middle-aged bodies are not as resilient as they used to be and emphasize the importance of safe physical activity and exercise.

The AAOS recommends a balanced fitness regimen including cardiovascular activity, strength training, and flexibility exercises. This is based on the premise that the better condition a person is in, the less likely he/she is to get injured. The AAOS also advises varying the modes of exercise in order to give muscles a rest so that overuse does not become a factor.

-Julia Devonish

Kelly's Corner

Last year I wrote of the enhanced quality of life we all potentially possess by staying active. I suggested we revisit our commitment to activity and do it with new resolve and passion. At SCSU's spring commencement, Ken Kelsey delivered the faculty's address to the graduating Master's students. I often think about what he said and I would like to share it with you. It actually came from Phillip Hartner, MD, of Stanford University School of Medicine. It is entitled, "The Earth".

If we could shrink the earth's population to a village of precisely 100 people, with all the existing human ratios remaining the same, it would look something like this: There would be 57 Asians, 21 Europeans, 14 from the Western Hemisphere, both North and South, and eight Africans. Of the same 100, there would be 52 females and 48 males, 70 non-white, 30 white, 70 non-Christian, 30 Christian, 89 heterosexual and 11 homosexual. Six people would possess 59% of the world's wealth and all six would be from the US. Eighty people would be living in substandard housing, 70 would be unable to read, 50 would suffer from malnutrition. One would be near death and one near birth. Only one would have a college education and only one would have a computer.

Knowing this I now view daily things a little differently. I am thankful for our daughters who are not doing dishes but are watching TV, because that means they are at home and not on the streets; for the mess to clean up after a party, because it means that I have been surrounded by friends; for a lawn that needs mowing and gutters that need fixing, because it means I have a home. I am thankful for my weariness at the end of the day, because it means I was able to work hard and for the alarm that wakes me every morning, because it means that I am alive. An alternative to living does not exist. So, let's try and live the best we can and be thankful for everything we can do in our lives.

-Dr. Bacharach

Distinguished Thesis of 2000 Award

Former graduate student Wayne Board received the Distinguished Thesis of 2000 Award at St. Cloud State University. A dinner will be held in his honor on February 14, 2001. Attendees will include the President and Vice-President of St. Cloud State University, as well as the Dean of Graduate Studies and his advisor, Dr. Glenn Street. His thesis has been forwarded to a national competition and has been submitted to the Prosthetics and Orthotics International Journal for peer review.

The thesis, entitled, "A Comparison of Below-Knee Amputee Suction and Vacuum Socket Conditions," is the culmination of two years of work with TEC Interface Systems of St. Cloud. Wayne documented that application of a vacuum in the interface space of a socket prevents the long term problem of daily limb volume loss. This has profound implications for the prosthetic market since volume maintenance will eliminate the problem of poor fit, and its associated problems of liner failure, skin trauma, poor prosthetic control and frequent refitting of sockets.

We would like to thank TEC, Inc., St. Cloud Orthopedic Associates, LTD. and Suburban Radiological Consultants of Minneapolis. Without their financial support, this project would not have been possible.

Thesis Testing

Daily loss in limb volume is a common problem for people with an artificial leg (prosthetic limb). Feeling is often reduced and pressure points on the limb can result in painful sores.

Traditional methods of compensation for volume loss include adding socks or small pieces of material to the liner or socket throughout the day. This can be very inconvenient for the amputee and often increases the volume loss. TEC Interface Systems of St Cloud, MN has developed a vacuum-assisted socket that has been shown to allow below-knee amputees to maintain normal limb volume during activity.

The hypothesis is that the vacuum-assisted socket produces different pressures on the limb than the traditional socket, allowing volume to remain unchanged throughout the day. In order to test this hypothesis, urethane liners will be instrumented with sensors to document pressures on the limb during walking.

It is thought that lower pressures seen while walking, using the vacuum-assisted socket, will either reduce the amount of fluid forced out or increase the amount of fluid drawn into the limb, thereby preventing overall volume loss. Maintaining the fit of the prosthetic leg throughout the day can drastically improve the quality of life for many amputees.

-Tracy Beil

Who's New In The Lab This Year

Julia Devonish

Julia is from Virden, Manitoba. She graduated in May of 2000 from Valley City State University with a B.S. in physical education and a minor in chemistry. Julia is pursuing her graduate degree in exercise physiology. Julia participated in volleyball and aquatics through college. She also enjoys a variety of other sports, caring for her fish and plants, a good book, a nice warm bath, and spending time with friends and family.

Megan McNair

Megan McNair is a first year graduate student studying exercise physiology. Originally from Kenai, Alaska, she now lives in Collegeville, Minnesota. Megan received her bachelor's degree in liberal studies with a pre-physical therapy focus and a sports medicine minor from College of St. Benedict/St. John's University. Megan still returns to Alaska in the summers to visit family, friends and work the commercial salmon fishing season. When Megan isn't working near the ocean, she enjoys working at the swimming pool as a coach and swimming instructor.

Steve Vrieze

Steve is a first year student in exercise physiology. He is originally from Spring Valley, MN. Steve is a 2000 graduate of Hamline University in St. Paul, MN, with a degree in exercise and sport science with a minor in health science. He was married this July. Steve enjoys watching football, the outdoors, and spending time with family and friends.

Jesse Moore

Jesse is a first year graduate student studying sports management. He grew up in St. Paul Park, MN. He earned his undergraduate degree in exercise science at the University of Minnesota Duluth. Jesse is a NSCA certified personal trainer and enjoys helping people learn to exercise properly. He also likes to coach baseball. Jesse has coached his little league teams to three championships over the last five seasons.

Tal Amasay

Tal is from Israel. He graduated from Wingaite College, Israel, with a degree in physical education. He is a first year student pursuing his graduate degree in biomechanics. During the last four years Tal worked in Colombia and in New York City. Tal loves to travel the world and experience new cultures. Tal has an interest in track and field, especially high, long, and triple jumps.

Dave Enneking

Dave is a first year graduate student majoring in exercise physiology. He is originally from Glencoe, MN. Dave received his B.S. degree from Minnesota State University, Mankato, with a double major in exercise science and athletic training. Dave has a graduate assistantship through St. Cloud Orthopedic Associates working as an athletic trainer for St. John's University. Dave hopes to work with collegiate athletes as an athletic trainer after graduation. He enjoys exercising, fishing, camping, hiking, downhill skating, and canoeing.

The Lowdown on Antioxidants

Lately nutritional supplements have gained popularity for their health benefits. One of the most highly publicized of these supplements is antioxidants. The leading selling supplement on the market, vitamin C, is an antioxidant. Other antioxidants include vitamin E and a component of vitamin A, beta-carotene. However, the debate continues as to the role of supplementation or dietary intake of these antioxidant vitamins to counteract the effects of disease and aging.

Formation of "free radicals" is a common process in aerobic metabolism. When these molecules are formed, they can attach and damage other molecules. This is the theory behind free radicals and disease or the aging process. Vitamins C, E and beta-carotene can neutralize a free radical. In this way, the body can control the number of free radicals as long as it has some of these vitamins available.

The value of taking an antioxidant as a supplement is still unclear. Adequate amounts of the antioxidant vitamins C and E and beta carotene can often be derived from an individual's diet. Good sources of vitamin C and beta – carotene include fruits and vegetables. Vitamin E can be found in vegetable oils and soybean, corn, and wheat germ. Those with deficiencies in these areas should consider a supplement. However, there is no concrete evidence to support the benefits of taking a supplement. Some researchers suggest that as little as one glass of orange juice or carrot juice provides enough protection against free radicals. Others suggest that individuals need to take dosages 10 to 100 times the recommended intake of antioxidant vitamins to see positive results. The length of time an individual needs to take the supplement is also unclear. Some estimate it takes two years to gain maximum benefit.

In conclusion, intake of antioxidant vitamins does have positive benefits in the form of disease reduction. However the jury is still out as far as how much and/or how long the vitamin should be taken. The safest bet is to eat a well balanced diet of fruits and vegetables and engage in regular physical activity. If you are still considering a supplement, consult your physician or a dietitian and stick to the dosage recommendation they suggest.

-Steve Vrieze

Try a Massage

Do you want to control stress and make your life more manageable? Try a massage. Massage has been shown to alleviate strains, muscle pain and tension, lower blood pressure and raise serotonin levels. Serotonin is a chemical that acts on the brain to calm the body.

Scientists have found that massage is great for relaxation. A massage has also been touted to boost your immune system and dampen harmful stress hormones in your body. How might massage do this? One way is by increasing circulation in the muscles, which would be effective on soreness after exercise.

Subjects who were massaged for 15 minutes twice a week had greater alertness than subjects who practiced relaxation techniques for the same amount of time.

Massage can also stimulate nerves that carry signals from the skin and muscles to the brain. Even brain waves are altered by massage.

There are many different kinds of massage. A Swedish massage, with long soothing strokes, is good for relaxation, while a "deep tissue" massage uses pressure to penetrate the deeper muscles to relieve pain. There is even a sports massage, which uses various techniques to reduce soreness, prevent injuries, and treat sprains, strains, and tendonitis.

I would recommend a massage to anyone. You can get a professional massage here at St. Cloud State. I made an appointment for a Swedish style massage. Afterward I felt great. If you are interested in getting a professional massage here at SCSU, contact Campus Recreation at 255-3325.

-Jesse Moore

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 2000:

Kelijo Fernholz
Scott McMillan
Aaron Nelson
Eric Fenstad
Wayne Board
Janice Engebretson

Keeping Your Vessels Young

The blood vessels of older athletes function just as well as those of people half their age. Researchers came to this conclusion after looking at both sedentary individuals and athletes in two age categories: those in their late 20s and those in their 60s.

Exercise apparently helps keep arteries "young" in several ways:

- It keeps blood vessels flexible, allowing them to dilate easily to accommodate increased blood flow.
- It keeps down levels of free radicals, which can cause "bad" LDL cholesterol to oxidize and stick to artery walls, eventually leading to narrowed and blocked vessels.

The athletes in this study were all triathletes (running, cycling and swimming). "But," says lead researcher Stefano Taddei, MD, "aerobic activity at least five days a week, rather than intensive training, might just do the trick."

-Source: Circulation, Vol. 101, No. 25

Health Related Resources

Quality Fitness Related Websites
http://www.montana.com/stafford/fitnesslinks.html

Government Health Finder
http://www.healthfinder.gov

Mayo Clinic Health Letter
Write to: Mayo Clinic Health Letter, Subscription Services, PO Box 53889, Boulder, CO 80322-3889 or call (800)333-9037

The New York Times Book of Health: How to Feel Fitter, Eat Better, and Live Longer
Jane E. Brody, the New York Times / Paperback (1998)

Tufts - Nutrition Navigator
Http://navigator.tufts.edu/

Harvard Health Letter
Write to: Harvard Health Letter, P. O. Box 4203000, Palm Coast, FL 32142-0300 or call: (800) 829-9045

Nancy Clark's Sports Nutrition Guidebook: Eating to Fuel Your Active Lifestyle, 2nd Edition.
Nancy Clark, MS, RD. Human Kinetics, Champaign, IL.

American Heart Association Low-Fat, Low Cholesterol Cookbook: Heart-Healthy, Easy-To-Make Recipes That Taste Great.
2nd spiral edition (January 1998)

Eating Well for Optimum Health: The Essential Guide to Bringing Health and Pleasure Back to Eating.
Dr. Andrew Weil, Quill Publishing, Paperback, March 2001

Internship Experience

This summer I completed an internship at the Bally Total Fitness Center in New Hope, Minnesota, along with my classmate Jeremy Frost. The purpose or goal of our internship centered on four objectives: strength conditioning, special populations, nutritional issues and observing athletic trainers with their clients.

As a part of our internship, Jeremy and I were asked to develop a strength and conditioning program to help Bally's bring younger clients into their clubs. By implementing specialized programs for young athletes, the company hopes to widen and diversify their clientele. The program we developed, titled the Pinnacle Performance Program, targets high school and collegiate athletes. We designed a versatile program that involves stretching, strength training, plyometrics and agility drills, aerobic training and other sport specific drills.

Jeremy and I also reviewed current literature on special populations such as the elderly, obese, handicapped, diabetic, elite athletes, pregnant women and young athletes. These specific populations require special fitness/exercise considerations or guidelines. Our goal was to build or strengthen the knowledge of the Bally's staff enabling them to work with these special populations effectively. In other words, we helped establish certain protocols for the athletic trainers to follow and what training they should avoid for specialized groups.

In addition to our research on special populations, we reviewed literature on important nutritional issues. Many people are not well informed on subjects like fad diets, supplements, and nutritional outlines for athletes and the obese. Our review focused on these nutritional aspects and will provide Bally's with the background to advise their clients responsibly instead of repeating marketing claims.

Finally, Jeremy and I observed the athletic trainers with their clients. We were encouraged to provide additional information or ideas we believed would assist the client reach his/her goals. It was a good chance for Jeremy and me to get to know the clientele and work on our communication and social interaction skills.

-Angela Frelich

An Assistantship with the SCSU Nordic Ski Team

My graduate assistantship has enabled me to work with the women's Nordic ski team for the past two seasons here at SCSU. The skiers are tested in the Human Performance Lab several times every year, and it was this first interaction with the team that turned into an opportunity to work with the team in a greater capacity.

I am now in a position to work with and help the ski team improve in all aspects of skiing. Working with the ski team allows me to do something I love to do, and to teach what I have learned from skiing and racing to this team. Being a graduate student in exercise physiology also allows me the chance to take what I have learned in the classroom out into the field. I am actively involved in the training and conditioning process of the team.

Starting in early October we work with the athletes on a daily basis. We work hard everyday to help the athletes improve their strength, endurance and technique. This work prepares the skiers for the NCAA qualifying races that occur in January and February.

Working with the team during training sessions and traveling with them to races allows me to see all aspects of coaching and conditioning college athletes. It has been a great experience and has allowed me to learn a great deal about training athletes. I would like to thank Susan Sandvig-Shobe and Ion Sencha for allowing me to be involved with the team, and for teaching me about achieving peak performance and how to teach others to achieve their goals.

-Jeremy Frost

What is Exercise Physiology?

Physiology is the general study of all life processes. In a specific sense, however, human physiology is the study of the *functions* of the human body. In this context, an exercise physiologist is interested in the influence of exercise on these body functions. Thus, an exercise physiologist must have a general understanding of the scientific basis underlying the exercise induced physiological responses.

Questions of interest to the exercise physiologist include:

- How does the heart function to move blood through the body?
- How does a muscle generate force?
- How does the body regulate its internal temperature during exercise?
- How does the body provide the necessary energy to perform the exercise task?

In addition, the exercise physiologist is interested in such questions as:

- What are the acute and/or chronic responses to particular forms of exercise?
- How does one become physically fit for particular sports activities?
- What are the different components of fitness?
- How does physical fitness relate to health or to illness?
- What is the influence of exercise in managing body weight?

Exercise physiology can, therefore, be described as the science which deals with the study of muscular activity and the associated functional responses and adaptations. An exercise physiologist is an independent research scientist who has earned a degree with an emphasis in the life sciences and has a primary research interest in physical exercise.

-Information from The American College of Sports Medicine

2000-2001 Papers and Abstracts

ARTICLES

Seifert, JG, ER Burke, AT White, MJ Luetkemeier, & S von Duvillard. The effects of ad libitum fluid ingestion on fluid balance during alpine skiing in alpine skiers. Coaching & Sport Science Journal, Italian Society of Sport Science. 3: 14-16, 1999.

PEER – REVIEWED ABSTRACTS

Frelich, A, JG Seifert. The effects of gender on toxicology of 14 days of ribose ingestion. *Med Sci Sports Exerc.* 33(5), 2001

Seifert, JG, A Frelich, J St Cyr. The toxicological effects of 14 days of ribose ingestion. *FASEB.* 2001

Frost, J, JG Seifert, DW Bacharach. The effects of a heat exchange mask on physiological function in exercise induced asthmatics. *Med Sci Sports Exerc.* 33 (5), 2001

Herm, L., Ficek, S., Simmons, D*., Olson*, A., & D. Bacharach, FACSM. How effective is a sport drink in enhancing performance of football practice drills? *Med Sci Sports Exerc.* 33(5), 2001

Devonish, J., J.G. Seifert, & S. Vrieze. The glycemic index of sport bars. *Med Sci Sports Exerc.* 33(5), 2001

Beil, T.L., G.M. Street, PhD, S.J. Covey, PhD, PE. Pressure measurement on residual limbs during ambulation while wearing traditional and vacuum-assisted prosthetic sockets. *Med Sci Sports Exerc.* 33(5), 2001

M. McNair, S. Vrieze, D. Bacharach, P. Bednarski*. Predicting heart rate and blood lactate in a roller ski biathlon race using field test data. *Med Sci Sports Exerc.* 33(5), 2001

Update Your Exercise Prescription!!

Many of you receiving this newsletter had an exercise evaluation conducted at the SCSU Human Performance Laboratory at some time. We encourage you to return to the lab for an updated exercise prescription. A reevaluation consists of any or all of the following assessments that will assist AFP staff in preparing a new exercise prescription for you:

- Treadmill 12-lead EKG graded exercise test (aerobic fitness is assessed by heart rate, blood pressure, and electrocardiographic responses to a graduated work progression)
- Body composition (skinfold measurements and/or underwater weighing)
- Pulmonary function
- Flexibility and abdominal strength
- Total cholesterol screening
- Nutritional analysis

To encourage more of you to return for this update, the HPL is sponsoring a 2 for 1 promotion. Talk to a friend, spouse, or colleague about sharing the cost of an evaluation and take advantage of the 2 for 1 promotion. Reevaluation fees are just $55 or $27.50 if you share the cost. We appreciate you suggesting our program to others. First time participants will also receive the 2 for 1 promotion. Call Barb at 320-255-3105 for more information or to register for this program.

Our Gratitude

The staff and students at the HPL would like to thank the following people for their contributions to the Adult Fitness Program during 2000.

Karen Askim
David and Nancy Bacharach
Ron and Mary Beth Cochran
Dennis and Anne Fields
James and Marcella Gammell
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Lee and Marlene Kasper
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David and Barbara Kunze
Ruth Nearing
John and Carole Pike
Sherwood Reid
Glenn and Nancy Street
Stephen and Elaine Thrune

We greatly appreciate the financial support so many of you have provided over the years. 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 HPL, please make checks payable to:

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