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Human Performance Lab Newsletter, February 2005

St. Cloud State University

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HUMAN PERFORMANCE LAB

We all live in suspense, from day to day, from hour to hour; in other words, we are the hero of our own story.

~ MARY McCARTHY



DEPARTMENT OF HEALTH,
PHYSICAL EDUCATION,
RECREATION & SPORT SCIENCE

FEBRUARY 2005

*Pictured: HPL Staff
John Seifert, Glenn
Street, Barb Kunze,
Dave Bacharach*



Kelly's Corner

– Dave Bacharach

When was the last time you considered the phrase “biggest loser” as a good thing? TV has provided us with the potential for our own “reality check”. Recently, *Good Housekeeping* and *People* magazine had cover stories on secrets to weight loss success. Are there really secrets? Does Dr. Phil have the inside track on losing fat forever? Well, when you look a bit deeper into all the strategies people have used, there are two common factors. These factors are not truly secrets, but rather commitments. The first commitment is changing one's behavior. Dr. Phil is not the first to suggest guilt, self worth, and/or emotions play an important role for many weight issues. He is also not the first to suggest positive affirmations go a long way in achieving personal goals. Overcoming that hurdle makes it easier to modify diet and perhaps put activity at a higher priority.

The second commitment is the strategy for success. We've all heard the line, “A calorie is a calorie is a calorie.” Technically speaking that is true; yet, practical experience tells us that our bodies do not see it that way. Our body is so very complex and yet simple. We all need carbohydrates, proteins and fats in

our diets. What becomes crucial for success is when and how much of each of these we consume at any given point in time. A traditionally healthy diet, Atkins, Weight Watchers, Nutri-system and Jenny Craig have all demonstrated success, but not for all. What becomes the key for many is not just the activity to calorie ratio, but when you eat those calories. So, how do we know when and what to eat? Nothing is fool-proof, but a good rule of thumb is to consume fewer processed foods and eat smaller portions. Eat lots of veggies! And, if you eat more than you should, don't just slump into the easy chair. Be active right away. It will help you feel a lot better.

Although we have little data from any of these current success stories about overall health, we do know that obesity is linked to many chronic diseases in our society. Activity has been prescribed for centuries to cure many common ills. So, as always, let's take care of ourselves, live the best we can, be active and encourage others to do the same.

HPL is on the Web!

– Glenn Street

We invite you to view our new website (<http://www.stcloudstate.edu/hpl/>). The website is comprised of five major areas plus past and present newsletters and a brief history of the Human Performance Laboratory:

- **Graduate Programs**
For those interested in entering the Exercise Science master's program.
- **Adult Fitness Program**
For those interested in becoming a participant in the Adult Fitness Program.
- **Corporate Research**
For businesses wanting assistance in research and development of their products.
- **Athlete Testing**
For coaches and athletes seeking training assistance.
- **Community Education**
For businesses or non-profits interested in educational sessions on healthy living.

One of the highlights of the web site is the Alumni Page in the Graduate Programs section. Photographs of our alumni are displayed along with their degrees, graduation date, current job title and employer. The purposes of this page are to show potential students what the alumni are doing and to help alumni keep track of each other. If you are an alumnus, we need your help. If your information needs updating or if you have emails for other alumni, please contact us. We appreciate your help and would love to hear from you.

You may want to note that email, fax and phone information is available on the website should you need to contact Barb Kunze, the three faculty, or the current graduate students.



How's Your Core? – James Burckhard

Core strength is a popular term used to define the strength of the trunk. The trunk includes muscles of the abdomen and back. Whether you realize it or not, your midsection is used in almost everything you do. It is used for stabilization in most exercises and is very important for good posture. For the general population, the sit-up can be used to test core strength.

Is a sit-up test not challenging enough? Try this. The test starts in a modified push-up position called the plank. Similar to the up position of a push-up, the plank starts with a straight body supporting your weight on your toes and your forearms. Your elbows should be beneath your shoulders and your

hands should be under your forehead. Your arms should look like two sides of a triangle coming together at your hands. Start the test by holding this position for 30 seconds. After 30 seconds, lift your left arm straight out to the side while balancing your body on your other three limbs. After 15 seconds, put your left arm down and lift your left leg out. The after 15 seconds, put your left arm down and your right arm out. After another 15 seconds, put your right arm down and lift your left leg out. Then after 15 more seconds, put the left leg down and lift the right leg out. This next part is tricky. Pick your left arm up and your right leg up. Now hold this for 15 seconds. Switch to your right arm and left leg for 15 seconds. Lastly, come back to

the original plank position and hold it for 30 more seconds. If you can complete this test, you have a very strong core. If any part of your body touches the ground other than the specified limbs, the test is over.

You may also use the plank position as a means of strengthening your core as an alternative to doing sit-ups. To do this, use the plank posture explained previously. Then raise your body, keeping the back level and holding for 30 seconds. Increase this hold time up to one minute. A mat should be used for more comfort in performing this exercise. Good luck and have fun!

CONGRATULATIONS!

The faculty and staff at the Human Performance Laboratory would like to acknowledge and congratulate Michael Rasmussen and Karen Riska who completed their thesis work and earned a Master of Science degree in Exercise Science in 2004.

Predicting Heart Disease – Jixiang Zheng

The latest news, views, and strategies for living life says a stress test can predict if your heart's headed for trouble. IF you have none of the usual risk factors for a heart attack – hypertension, high cholesterol, or smoking – that doesn't mean you are in the clear. Doctors now believe they can better predict who will fall victim to the number-one killer merely by watching you move at full speed on a treadmill.

The standard stress test measures how hard you can push yourself while exercising and how quickly your heart rate recovers afterward. New research suggests that exercise capacity and heart-rate recovery are powerful predictors of who will develop heart disease.

It's not surprising that fit people have healthy hearts. Yet asking patients how much they exercise isn't a precise method of gauging cardiovascular fitness. Exercise capacity is a more objective way of measuring fitness. According to a recent Journal of the American Medical Association, about 85 percent of men and women who develop heart disease have

at least one major risk factor. That still leaves many who don't. A stress test could help save their lives! For someone with one or more risk factors, the test could help doctors more accurately assess their odds of developing heart disease.

The Cardiology Center at Johns Hopkins Medical Institute studied 5000 women and found those that scored low on a stress test were three times as likely to develop heart disease as the average women. The test proved useful in finding women at risk even though they didn't have conventional risk factors like smoking, diabetes, high blood pressure, or high cholesterol. Studies also show that sedentary people who become more active can improve their exercise capacity by 15-30%, boost heart-rate recovery and reduce their cardiovascular risk.

The safest and most reliable way to measure exercise capacity and heart-rate recovery is by taking a stress test in a health institution, such as the SCSU Human Performance Laboratory. **If you are active and have no**

risk factors and on no medications, you can try the max test outlined below.

- **To measure exercise capacity:** push yourself as hard as you can on an exercise machine that calculates METs, (metabolic equivalents). Average for women is 7.5 METs; top scorers hit up to 14.6. Men average 9 METs up to 16 METs. If you score below average and don't exercise as often as you should, now's the time to start.
- **To measure heart-rate recovery:** push yourself as hard as you can doing any aerobic exercise. Without stopping, quickly count your pulse for 15 seconds and multiply by 4 to calculate your per-minute heart rate. Stop exercising, wait two minutes, and calculate your heart rate again. Subtract the second number from the first to see how far your heart rate has dropped. Top scorers saw their numbers fall by 66 beats or more. The more your heart rate falls, the lower your risk of heart disease.



Making Sense of the Numbers: Training Zone – Jill French

Exercise guidelines recommend we participate in 30-90 minutes of moderate intensity physical activity three to five times per week. That seems easy enough to accomplish. Or, does it? How do we define “moderate”? Moderate intensity for a well-trained athlete may be running five miles in 30 minutes. Yet, for someone in poor condition, moderate intensity may mean walking one mile in 30 minutes. The American Council of Exercise (ACE) defines moderate intensity as 50 to 80 percent of maximum heart rate (MHR). The MHR is how fast the heart beats per minute during maximal exercise. You may estimate your MHR and moderate intensity training zone with the following calculations. Your actual MHR may vary +/- 10 beats per minute (bpm) of the calculated MHR.

Estimating Moderate Intensity Training Zone

1. To calculate maximum heart rate:

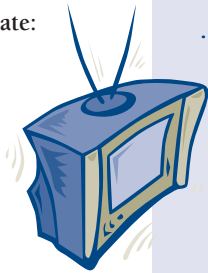
MHR=220-age. (Example:
For a 30 year old,
MHR is 190 bpm).

2. Determine bottom of zone.

Multiply MHR by 0.5.
For a 30 year old,
190x0.5=95 bpm.

3. Determine top of zone.

Multiply MHR by 0.8.
For a 30 year old, 190x0.8=bpm.



Below are some examples of moderate intensity heart rate zones for different age groups:

AGE:	20	30	40	50	60	70
50%	100	95	90	85	80	75
80%	160	152	144	136	128	120

Provided by www.acefitness.org

To monitor heart rate, use the radial pulse at the base of the thumb or the carotid pulse at the side of the neck. By using the first two finger of one hand, locate the artery at the base of the thumb on either hand to obtain the pulse rate. Immediately after exercise, locate your pulse and count the number of beats in a 10-second period. To determine the heart rate in beats per minute (bpm), multiply the number of beats in 10 seconds

by six. For instance, if a 10-second pulse count were 20, then the heart rate would be 120 bpm. For those on medication or looking for a more convenient method to determine heart rate, consider using the Ratings of Perceived Exertion (RPE) method and the Talk Test.

RPE

While exercising, one perceives exertion both physically and mentally. The RPE scale starts with 0 and ends with 10. A rating of 0 relates to doing nothing, while a 10 is equal to a maximal effort. According to ACE, someone exercising in the moderate intensity zone will report an RPE of 4-6.

Provided by www.acefitness.org

RPE SCALE

- 0 nothing at all
 - 0.5 very, very weak
 - 1 very weak
 - 2 weak
 - 3 moderate
 - 4 somewhat strong
 - 5 strong
 - 6
 - 7 very strong
 - 8
 - 9
 - 10 very, very strong
- Maximal



Talk Test

Like the RPE, the talk test is subjective. University of Wisconsin-La Crosse researchers discovered that if you can't recite the Pledge of Allegiance out loud while exercising, your intensity is too high. So if you can't orate, decelerate.

Once you get going, you want to keep up the exercise habit so don't turbo-charge your workouts beyond your capacity. For the most accurate determination of intensity, an exercise evaluation at the Human Performance Laboratory will help assess the specific training zone for your exercise goals.

Myths of exercise

– Joe Harmon

Exercise has many reported benefits: reduced levels of stress, decreased chance of heart disease, reduced risk of hypertension and stroke, increased ease of performing everyday activities ... and so on. Yet there are several myths that individuals should recognize to assist them in improving their fitness level.

Myth #1:

Spot Reduction: Exercising a certain muscle or muscle group will reduce body fat in that area in order to get that “ripped” look.

Doing sit-ups will, however, give you stronger abdominal muscles. Taking away the extra layer of fat on your stomach is done most effectively through a combination of proper diet and being physically active.

Myth #2:

Cardio workouts need to be intense and strenuous in order to be beneficial.

Cardiovascular exercise is a great way to improve your heart health and overall fitness. Research has repeatedly demonstrated that intensities 50-80% on one's maximal work output can improve fitness. For someone 30 years old, a heart rate of 95-152 bpm would be most beneficial. Many individuals may find it hard to keep their heart rates this low, even though they will benefit more from their activity at these rates.

Myth #3:

If I lift weights, I will become too muscular and bulky looking.

Gaining muscle mass is usually a good thing. Lifting 2-3 sets for 10-15 reps several times a week will not make you too muscular or bulky. You may feel bigger immediately after lifting, but that acute change in muscle will quickly disappear. Individuals that are very muscular and bulky have dedicated many, many hours in the weight room, using very specific lifting programs, and are highly focused on gaining muscle. So, do not shy away from a lifting program. A strength routine added to your cardio workout is a great way to burn extra calories.



Cardiac rehabilitation: Still as important as it was 20 years ago? – Patty DeClercq

In a modern era of heart medications, the old standby of cardiac rehabilitation has become somewhat passé in the eyes of many. However, recent studies show that participation in cardiac rehabilitation is just as crucial now as it was 20 years ago. In fact, studies show that not participating in a cardiac rehabilitation program increases mortality rate by 48% within three years. Also, the risk of having a re-occurring heart attack is greatly reduced with participation.

So what exactly is cardiac rehabilitation? Cardiac rehabilitation is a program of comprehensive exercise, educational, and

behavioral modification designed to improve the physical and emotional condition of patients with heart disease. Patients are encouraged and supported by a team of healthcare professionals to achieve and maintain optimal physical and psychosocial health. The programs usually include an individually tailored exercise program, education and help to reduce risk factors, such as changes in diet or smoking cessation, and help managing the disease.

Each exercise session lasts between 30-60 minutes, placing extra emphasis on warm-up. The warm-up phase should last about

10 minutes and consist of light calisthenics and stretching. Following exercise, a cool down of about 10 minutes consists of stretching. Some examples of exercises used in a cardiac rehabilitation program include the use of stationary bikes, treadmills, elliptical machines, low impact aerobics and swimming. Although most rehabilitation programs only last between three to six months, it is important for patients to continue with the exercise program throughout their lifetime.

Rationale for smoke-free public places – Sue Lynn Peart

Everyone knows, or has heard, how smoking cigarettes affects the human body. Cancer, emphysema, and heart disease are just some of the well-known life threatening dangers. Smoking also causes an increased risk of upper respiratory disease, a lowered immune system, and a possible link to depression. We know that smoking makes your hair, hands, and clothes smell offensive. We know that it costs an estimated \$3.00 per pack. (A one pack a day smoker spends upwards of \$1,100 per year on cigarettes.) We have heard the statistics ... there are 4,000 different chemicals found in a single cigarette and of these over 60 are known carcinogens (cancer causing chemicals.)

Now, let's take a look at the effect of cigarette smoke on non-smokers. Secondhand smoke is classified as a Class A carcinogen (similar to asbestos and radon) which means there is **NO** safe level of exposure. Furthermore, the Environmental Protection Agency (EPA) states that secondhand smoke cannot be reduced to safe levels through ventilation. Although proper ventilation may reduce some of the offensive odors, it does **NOT** eliminate the known cancer causing carcinogens! It is clear that secondhand smoke affects everyone exposed to it. In fact, according to the Centers for Disease Control -

exposure to as little as 30 minutes of smoke in the air can significantly increase the risk of heart attacks. In addition, the National Cancer Institute estimates that exposure to secondhand smoke causes 8,000 new cases of asthma nation-wide every year. In Minnesota there are 160-250 new cases of asthma yearly.

Did you know:

- Five minutes of exposure to secondhand smoke stiffens the aorta as much as smoking one cigarette?
- Smoke from one cigarette will remain in a room for up to five hours?
- SCSU is one of only two universities in the MNSCU system that allows indoor smoking on campus?
- 98% of all colleges prohibit smoking in all public areas throughout their buildings?

It is time for a change:

VOTE FOR SMOKE-FREE PUBLIC PLACES!

Preventing ankle re-injury – Ann Studniski

The most common risk factor for spraining an ankle is a history of a previous sprain. For some individuals it is common to re-sprain an ankle when participating in physical activities. One of the reason behind this high rate of ankle sprain recurrence is the loss of joint position sense or spatial awareness. When tissue is damaged and, therefore, can no longer send feedback to the central nervous system. This results in the loss of joint position sense (proprioception). This can be a permanent loss; however, it

is possible to retrain the joint and restore proprioception. Some very simple exercises can be done to help improve proprioception. These include different types of balancing exercises such as standing on one leg, jumping and touching the ground while standing on one leg. All of these can be done at home without any equipment. Once these exercises can be performed comfortably, one should repeat these exercises while standing on a balance pad or rocker board. A pad makes maintaining one's balance more

challenging. This is thought to improve joint awareness while placing minimal stress on the damaged tissue. These exercises increase the strength of the muscles around the joint and also help improve the integrity and stability of the joint and, therefore, lower one's risk of re-injury.

New Faces in the Lab

James Burkhard (*back right*) is from West Fargo, ND. He lived in West Fargo for 22 years and moved to Moorhead, MN, last year. He graduated from Minnesota State University of Moorhead with a degree in exercise science. He interned at Meritcare Hospital in Fargo, ND. He likes to work out and watch/play sports.

Patty DeClercq (*from right*) is pursuing a special studies degree in cardiac rehabilitation. She grew up in Bottineau, ND, and moved to West Fargo, ND, where she graduated from high school. Patty graduated from North Dakota State University with a major in exercise science. Her interests include traveling, downhill skiing, rollerblading, and biking. In the future, Patty would like to work in a clinical setting with cardiac rehabilitation

Sue Lynn Peart (*front left*) grew up in Buffalo, MN. She completed her undergraduate degree in health and exercise science at Colorado State University (CSU). While at CSU, she had the opportunity to study abroad in Australia and fulfilled an internship at the White House Athletic Center in Washington D.C. Sue Lynn is completing her Special Studies master's degree in sports training. Currently, her strength and conditioning coach internship is with the Augsburg College women's ice hockey team. As a former hockey player, she chose to examine hockey skating skill between Division I and Division III ice hockey players as her thesis.

Ann Studniski (*back left*) is from the St. Cloud area. She received her bachelor's degree from the University of Minnesota in biology and physiology. She is working on a master's degree in exercise science and athletic training certification when she is not downhill skiing.

Joe Harmon (*back center*) is from Northwood, IA, majoring in exercise physiology. He graduated from the University of Northern Iowa, with a degree in exercise science. Joe enjoys playing and watching sports.



Better to light
a candle than to
curse the darkness.
~ CHINESE PROVERB

It's not enough to be
good when you have the
ability to be better.
~ A.L. COX, GRADE 8

Xingyi Zou (*front center*) is from Beijing, China. Before coming to St. Cloud, she worked as a doctor in the Sports Hospital and worked as the team physician for the Chinese National Swimming Team. This provided her with the opportunity to represent China as the youngest team physician in Athens for the Summer Olympic Games. She received her Bachelor of Medicine in Clinical Medicine, at the University of Qingdao. Currently she is pursuing a master's degree in sports management. While sports are her first love and provide both mental and physical relaxation, she also enjoys playing with her niece and pet dog Haobao, which means good baby in Chinese.

Water – The drink for life – Sarah Nardi

Our body is about two-thirds water making it an important nutrient for life. Water helps regulate temperature, carry nutrients and oxygen, remove waste, cushion joints, and protect organs and tissues. It's common to hear we need eight glasses of water a day. Other sources suggest drinking 10-12 glasses or more each day. Other research implies that eight glasses of water a day is a myth. How much water we need varies with body size, climate, environment, and activity.

There are three sources for water: fluids, food, and metabolism. Some fluids are carbonated or caffeinated. Some have alcohol. Others vary in sugar, protein, and electrolyte content. While fluids such as juice, soda, and coffee do contribute to hydration levels, water is still the best choice to maintain proper hydration. Food can be a source of water.

Vegetables can be as much as 90% water, while meat and oils have a low water content. Water produced from metabolic processes typically gets used as quickly as it is produced and is less useful in maintaining hydration.

How many glasses of water a day? It depends.. Check your urine color. Light yellow with little or no odor suggests normal hydration. If you're thirsty, you are probably dehydrated. Bottom line: Drink enough throughout the day so you never feel thirsty.



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Email: brkunze@stcloudstate.edu



Thank you, Thank you, Thank you, Thank you!!!

The HPL staff and students would like to thank the following people for their contributions to the Adult Fitness Program in 2004. Because of your contributions, the HPL has another new treadmill and a PC based EKG system.

David and Nancy Bacharach
Linda Bettison
Mary Beth and Ron Cochran
Ray and Phyllis Collins
Chuck and Janice Engebretson
Dennis and Anne Fields
James and Marcella Gammell
Curtis and Betty Ghysin

Jeff and Kim Holmberg
Randall Jensen
Rick Jones
Lee and Marlene Kasper
Kenneth Kelsey
Louis Krippner
David and Barbara Kunze
Maynard Larson

Tom and Mille Lembeck
David Marquardt
Marie McConnell
Mary R. McKenzie
Ruth Nearing
Harry Olson
John and Carole Pike
Sherwood and Carol Reid

Sid and Pat Prom
Ken Shorter
Timothy N. Schuchard
Glenn and Nancy Street
Stephen and Elaine Thrune

Should you be in a position to make a contribution to the HPL, please make checks payable to the SCSU Foundation-Adult Fitness and mail them to: David Bacharach, St. Cloud State University, Halenbeck Hall 111, 720 Fourth Ave. S., St. Cloud, MN 56301-4498

Cold weather research – John Seifert

Cold research has infiltrated the Human Performance Laboratory, again. Through a grant from Polarwrap, Inc., we were able to continue our cold weather research. In this study, we investigated the effects of a heat exchange mask on cardiovascular stress in hypertensive subjects. A heat exchange mask is worn over the nose and mouth. The mask traps some of the exhaled heat and water vapor, and then uses it to warm and humidify the cold, dry inhaled air.

Thirty subjects volunteered to sit in the cold (23°F) trailer for 60 minutes on two occasions. On one trial, they wore the heat

exchange mask while on the other trial they did not wear a mask. Results clearly demonstrate that when the mask was not worn, blood pressure increased by nearly 20%. Ironically, it did not matter if the subjects were on medication to control blood pressure or not. However, when they wore the mask in the cold, blood pressure was maintained at normal levels for the entire 60 minute exposure. These results emphasize that there are simple things we can do to maintain normal blood pressure during the cold months of winter.