



Human Performance Lab News & Views

Department of Health, Physical Education, Recreation and Sport Science

MARCH 2007

KELLY'S CORNER

-Dave Bacharach

Annual greetings to everyone. Each year we try to get our newsletter out in a more timely fashion and somehow it doesn't get done. This year I am to blame. Barb Kunze, our program coordinator, bookkeeper, supply sergeant, and surrogate mother to all our graduate students is retiring after 24 years at the HPL. Perhaps in the back of my mind I thought if I didn't write a deservedly rich acknowledgement of what she has meant to everyone that she wouldn't be able to leave. I am now only a few days away from that critical deadline realizing nothing I can do or say, will, or should, prevent the inevitable.

Jack Kelly, in his infinite wisdom, asked Barb to join the HPL in 1983. Jack is one of the best judges of character that I know, and he tapped a gold mine in Barb that we continue to harvest. Thanks, Jack! Last week I asked Barb about some of her early memories and here are just a few she mentioned:

~When Jack gave me a tour of Halenbeck on January 13, 1983, my first day of work at the HPL, he said "You know Halenbeck has an elevator, but we always use the stairs." That was his subtle way of suggesting extra steps each day.

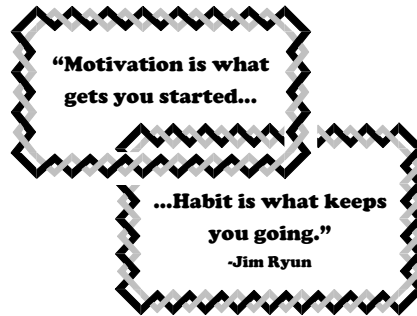
~In 1985 Dave Johnson suggested I start using an Apple computer instead of a typewriter. I hated using the lab typewriter so I was willing to give it a try. Thank goodness I did as it made my job so much easier.

~I wonder how many birthday cakes I have baked in 24 years of celebrating student and faculty birthdays. I think my carrot cake was always a favorite. As I learned more about nutrition and health, I adjusted the recipe to be more heart healthy. Of course the staff and students always remembered mine too. One year the grad students covered my desk area with crepe paper streamers and balloons.

~Enjoying the midnight bowling at the Indianapolis ACSM annual meeting, the only one I ever attended.

~I'll always remember "getting out the newsletter", assisting with the NACSM meeting, organizing and participating in noon time exercise with Mary Beth Cochran, scheduling lab activities and meeting new students while keeping in touch with alums.

It is quite clear that Barbara Rose Kunze has meant the world to many of us. Each of us as new faculty had the pleasure of having the office next to Barb.



Receiving a cheerful hello, or listening to Barb's welcoming voice when answering the phone, strengthened the feeling that we are all a part of one big family. We recently had a prospective graduate student come from California for a campus visit. He was able to talk with faculty, current students and a visit wouldn't be complete without talking to Barb. When it was time to go, he came back to my office and thanked me for the visit. He turned to leave, then turned back and said, "This is like one big family here. Thanks."

The HPL and its family has seen many changes in 24 years, but the mission has remained the same: assisting others in meeting life goals in education and fitness. Barb is, and will always be, a big part of the HPL family. It is time for Barb and her husband Dave to do other fun things. One of Dave's favorite phrases is that he looks forward to "getting up in the morning with nothing to do, and going to bed with only half of it done." Hopefully that will become one of Barb's favorites too. Spoken like true North Dakota farm folk, ya?

A fitting end to a tribute to Barb is best served by her own words: "My 24 years of continuous service at the SCSU HPL reminds me that this has been a most rewarding experience, and one that I am glad I didn't miss. Thank you to all who made each day at the lab memorable." We say, "Thanks, Barb. We love you!!"



10,000 Steps a Day for Good Health - Katie Snodgrass

The campaign for 10,000 steps a day has been gaining popularity in the media. Though many people have heard about it, few people really understand what the campaign is all about and how to apply it to their own lives. The concept is very simple, and it can be an extremely useful guide for increasing physical activity for better health. It is based on the U.S. Surgeon General's recommendation for 30 to 60 minutes of physical activity on most days of the week. This goal can often seem overwhelming and unattainable for many individuals, while the goal of taking 10,000 steps a day can seem a bit less intimidating. Because of this, it serves as an excellent guide to increase and/or monitor physical activity.

So, how do you know if you have taken 10,000 steps a day? Familiarize yourself with a little gadget called a pedometer. The pedometer is a motion sensor that is worn on the body, generally clipped to a belt or pant waistline. It measures the number of steps you take by sensing the vertical motion. Pedometers are an inexpensive tool that can provide valuable information. They range in price from about \$5-\$40, depending on the model that you choose, and can be purchased at a variety of locations.

They are available not only at sporting goods stores but also many department stores, pharmacies, and even grocery stores. The most basic and inexpensive pedometers measure only steps, while others allow you to program the device to measure a variety of other things, such as distance walked in miles or kilometers and calories burned throughout the day. This is based on calculations using your weight, age, and stride length. While the extra information may be interesting, a simple measure of steps is really the most useful to be gathered from such a device.

Once you have a pedometer, wear it on a day that involves your regular amount of physical activity.

10,000 Steps...continued on pg 4



NEW FACES IN THE LAB

Matt Chapman is from Bloomington, Indiana, and has a B.A. in athletic training from Bethel University. He is pursuing a master's degree in biomechanics and hopes to then work with ice hockey as either a coach or athletic trainer. Currently he is working as the director of operations for the SCSU men's hockey team.

Adam Gartner grew up in Buffalo, Minnesota. He graduated from Embry-Riddle Aeronautical University with a degree in professional aeronautics. Adam currently works as a fitness specialist for the Sister Kenny Sports and Physical Therapy Center Fitness Laboratory. Adam enjoys competing in triathlons and running around with his huskies.

John Schapman is originally from Carroll, Iowa. He graduated from St. John's University in 2005 with a degree in dietetics. He is pursuing a master's degree in exercise physiology and would someday like to focus on endurance performance or cardiac rehab. John enjoys hiking and camping in his free time.

Nick Rosier is from Biwabik, Minnesota. He graduated from the University of Wisconsin—Stevens Point with a B.A. in history. He is currently an assistant coach for the SCSU swimming and diving team. Upon completion of his master's degree in exercise science, Nick would like to use his education to pursue a career in coaching at the collegiate level. His interests are swimming, skiing and coaching.

Ana Freire is from Rio de Janeiro, Brazil. She has a bachelor's and teaching certification in dance from Centro Universitario da Cidade and a two-year specialization in psychomotor education from IBMR. Ana has been teaching ballet and jazz since 1997 and taught art in Rio. Ana is pursuing a master's degree in biomechanics and hopes to work with professional ballet companies in injury prevention. She is interested in dance, biomechanics, and cultural activities.



Back: Adam Gartner, Matt Chapman, Nick Rosier, Ana Freire, Rita Moravec
Front: John Schapman, Andy Bjorklund, Cristina Nistler

Andy Bjorklund was born in Virginia, Minnesota and raised in Buffalo, Minnesota. He did his undergraduate work at the University of Minnesota—Duluth and now is pursuing a master's in exercise science. Andy enjoys running and biking. He plays softball in the summer and runs 5K's throughout the year.

Rita Moravec is from Annandale, Minnesota. She graduated from the College of St. Benedict in 2003 with a math major and secondary education minor and taught high school math for three years. Rita loves sports, especially ultimate frisbee, and she hopes to use her master's degree to educate and train athletes, primarily at the high school level.

Cristina Nistler is originally from St. Cloud and is a 2006 graduate of the University of Minnesota—Morris with a B.S. in Spanish and an area of concentration in wellness and sport science. While working on her master's degree, she also plans to get another bachelor's degree in athletic training. One day Cristina hopes to be an athletic trainer for the Minnesota Twins.

CONGRATULATIONS!!

The faculty and staff at the Human Performance Laboratory would like to acknowledge and congratulate

Steven Vrieze, James Burckhard, Joe Harmon and Mollee Ludtke

who completed their thesis work and earned a Master of Science degree in 2006.

WHAT THEY'RE UP TO

Kate Barnett is in her second year of the exercise physiology master's program. She is currently working on her thesis which involves the SCSU women's hockey team. A summary of her project can be found on page three.

Nate Hendrickson is currently in his second year and is working towards completion of his thesis project entitled "Prediction of One-Repetition Maximal Strength for NCAA Division II Football Athletes". Nate is attempting to develop an accurate method of predicting maximum strength using repetitions-to-failure instead of traditional one-repetition maximum testing. This will allow coaches, athletes, and strength specialists to assess improvements in strength and prescribe future training programs without exposing athletes to the risks inherent to one-repetition maximum testing. Nate will be working with the Milwaukee Brewers professional baseball organization as a strength and conditioning coach beginning in March.



Carbohydrate Replacement: Drinks or Gels? - Kate Barnett

The intermittent nature of ice hockey is characterized by short repeated bouts of intense skating interspersed by longer periods of low intensity skating and rest. During intermittent exercise, carbohydrates are degraded both aerobically and anaerobically. The importance of carbohydrates becomes paramount when engaged in high intensity exercise due to the fact that the higher the intensity of the exercise, the higher the rate of glycogen depletion.

The use of carbohydrates as a fuel is limited by the cellular supply of glycogen.

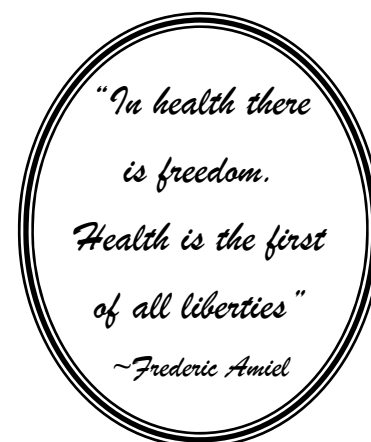
Studies have shown muscle glycogen stores to be depleted 60-70% from pre-exercise levels at the end of a hockey game. When glycogen stores are depleted, energy must be derived through the oxidation of free fatty acids. Energy produced from free fatty acids is only half that of aerobic glycolysis meaning power output and performance is lower.

Many studies have found positive effects on performance when carbohydrates are replaced during exercise. Carbohydrate replacement drinks have become

very popular in a variety of athletic events. However, many athletes find it difficult to ingest the amount of liquid required to replace the carbohydrates being used. This problem has been addressed through the making of concentrated gel packs that contain a 4:1 ratio of carbohydrates to protein. These gels can be taken quickly and digested easily in order to provide immediate energy to the athlete. The purpose of my thesis is to determine the effects of ingesting these gels on repeated sprints performed at the end of a hockey practice.

Tracking Your Health - Taken from the American Heart Association

Factor	My Goal	Date: _____	Date: _____	Date: _____
Total Cholesterol	< (less than) 200 mg/dL			
LDL (bad) Cholesterol	< 160 mg/dL			
HDL (good) Cholesterol	50 mg/dL or higher			
Triglycerides	< 150 mg/dL			
Blood Pressure	< 120/80 mmHg			
Fasting Glucose	< 100 mg/dL			
Body Mass Index (BMI)	< 25 kg/m ²			
Waist Circumference	< 35 inches			



Contribution of Hip External Rotation to Turnout in Adult Female Ballet Students - Ana Freire

Turnout in ballet is where each foot is rotated outwards so that the toes point sideways. Achieving turnout is considered essential when performing aesthetically pleasing classical ballet techniques.

It is conventional wisdom that turnout should be achieved primarily by hip external rotation to avoid foot, ankle and knee injuries. Studies of elite ballet dancers have consistently shown that turnout is achieved primarily (~70° of the 90°) by externally rotating the hip. The remaining 20° of splay is achieved by knee, ankle and foot movements.

Because no studies have measured the contribution of hip external rotation to turnout in *recreational* female ballet students we conducted a study to do so. Ten university dance minors with normal posture participated as subjects. Their average dance experience was 11 years but not limited to ballet.

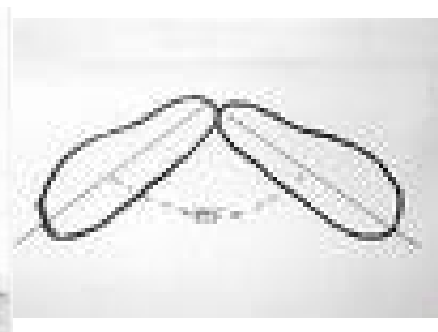
Subjects stood in an erect posture with the knees fully extended and the feet aligned parallel to one another. Then the feet were externally splayed 15°, 30°, 45°, 60°, and 90°. Video images of the dancers were recorded and analyzed to determine the hip external rotation angles.

What we found was that the recreational dancers achieved turnout quite differently from elite ballet dancers. While elite dancers achieve turnout mostly by externally rotating the hip (70 of the 90°), the university student recreational dancers relied mostly on foot, ankle and knee movements to achieve turnout (48 of the 90°). We think the major reason for this difference is that the hip muscles, ligaments and even bones of professional dancers have adapted to their lifelong participation in ballet. Professional dancers devote countless hours practicing, even at young ages.

The fact that the recreational dancers rely on considerably more foot, ankle and knee movement to achieve turnout almost certainly places them at a greater risk of injury in these joints. This begs the question as to whether these recreational dancers can take steps to reduce this risk by improving hip external rotation.

It is unrealistic to expect recreational dancers, who only participate in two or three ballet classes per week, to achieve the hip rotation of professional ballet dancers. However, they can expect to improve their hip rotation further by taking additional ballet classes and/or participating in a specific stretching/strengthening program.

We do not know how much these young adult, recreational dancers could expect to improve hip rotation; this is the topic of a future study to be conducted in the HPL. But it is quite certain that any improvements would reduce their risk of injury and would also improve dance performance.





Moving through the cold winter months - John Schapman

Living in Minnesota one can never escape winter. No matter where you go, it is always going to be there. So whether you are walking, running, or just out playing in the winter snow, there are a few things that happen to your body that make you feel challenged to move. Let's look at what cold weather does to your respiratory system. Environmental temperature and humidity both cause changes in the lungs which can cause asthma-like symptoms giving people trouble breathing in cold weather. When you exercise you typically breathe through your mouth causing the warming and humidifying mechanisms of the nose to be skipped. So now the air is colder and drier when it reaches the lungs. Your lungs generally like air to be warm and humid when it reaches the little air sacs called alveoli; so the cold, dry air causes the bronchial tubes to constrict creating the asthma-like systems. Humidity of the air is thought to be the bigger factor in asthma during exercise, and winter months in Minnesota host air that is both cold and dry causing each factor to affect you. Your lungs try to adapt to these changes in a variety of ways. Drying of the lung airways results in an inflammatory response attempting to retain moisture. This reduces the size of the tubes, which leads to asthmatic conditions.



10,000 Steps... (continued from pg 1)

At the end of the day, the pedometer will tell you how many steps you have taken in an average day. If it is 10,000 or more, great! Most people, however, will be below this number, especially if their job is primarily sedentary. Once you have found out the number of steps you usually take in a day, you can develop a plan to increase to 10,000 or more. Gradually work your way up to this goal by adding short walks throughout the day. Simple things, such as not using the remote while watching television, can also help to increase your number of steps.

Taking 10,000 steps may not be as beneficial as performing 30 to 60 minutes of continuous aerobic exercise, but can certainly help to increase physical activity and reduce risk factors for chronic disease. So, find out how many steps you are taking, and get on the road to better health. Happy stepping!

Why does my nose run when it is cold?

Many people ask why their nose runs when it's cold outside. There are many opinions why this might happen; but, here are two good scientific reasons. Under ordinary circumstances, the nose and sinuses produce as much as one liter of mucus every 24 hours. This mucus is constantly being swept back into the throat and subsequently swallowed. On cold days, when both the temperature and relative humidity are low, two factors can contribute to a runny nose. First, a small amount of condensation (water) accumulates from the exchange of cold and warm air through the nose. The second is that cilia of the nose become slower in the cold decreasing their ability to sweep the mucus back into the throat to be swallowed. The final result is it drains out the front. Maybe that's why good exercise mitts have a terrycloth thumb.

In Memoriam of Bill Gilman - submitted by John Keener



On September 18, 2006, my good friend and 1977 SCSU graduate, Bill Gilman, passed away from complications of amyotrophic lateral sclerosis (ALS). Throughout his professional career Bill remained interested in the HPL and its activities. Whenever he was on campus Bill made it a point to stop in the lab to see how things were going and to catch-up with Barb, Jack, Dave, Glenn, et al. After getting his master's degree at SCSU, Bill earned his Ph.D. from Kent State University, which is where I met him.

I left for UMD while Bill finished his degree. Luckily for all us, after graduating Bill became Director of Physical Fitness for the St. Paul Fire Department. He spent his professional career improving the health and fitness programs for their 400 plus firefighters, retiring just prior to his diagnosis with ALS in 2004.

Bill took ownership of the program and took it well beyond its mandated requirements by instituting educational programs aimed at offsetting the risks inherent in a firefighter's duties and lifestyle. As part of his commitment, he completed firefighter's training to become a full member of the department. In January 2006, the City of St. Paul recognized Bill by naming its Fire and Safety Services Training Facility "Gilman Hall." At his 59th birthday party last spring he was visited by five different on-duty engine companies complete with engines, lights, flashers and scores of firefighters wishing him well. It was quite a sight on his little neighborhood street in St. Paul. Following his passing, Bill received full honors from the St. Paul department.

Bill's interest was always in the total person, not just their MET level or fitness score. Whatever the group he was a part of, Bill became the unofficial social coordinator. He perfected the art of networking and excelled at making sure people belonged. He was always ready to talk about things, whether over coffee and a sweet roll, or on a basketball court, golf course or ski trail. Bill was a Fellow of the American College of Sports Medicine, a certified ACSM Health Fitness Director, and a NSCA Certified Strength and Conditioning Specialist. Bill also served as President of the Northland Regional Chapter of ACSM. The NACSM recognized Bill's importance to our organization by officially making "GILLY'S TIME" a part of the annual meeting. Plans for establishing an NACSM scholarship in his honor are underway. Bill is the first SCSU alumnus to leave us, but his memories will remain.

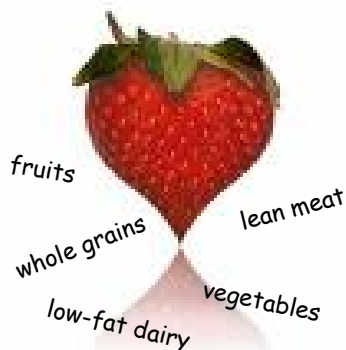
John Keener, Ph.D., FACSM, Associate Professor, University of Minnesota Duluth, Executive Director Northland Regional Chapter ACSM



Lab Research - John Seifert

This past year was another busy research year in the lab with students completing their thesis data collection and numerous presentations at the American College of Sports Medicine's annual meeting in May. First year master's students, Kate Barnett and Katie Snodgrass, presented data from a technical study on cholesterol testing. Second year students James Burckhard and Joe Harmon presented results on training impulse and carbohydrate supplementation during alpine skiing. Former graduate students Jill French and Karen Riska also presented data at the ACSM meeting. In October Dr. Seifert presented data at the International Society of Hypertension meeting on the comparison of cardiovascular responses from hypertensive and non-hypertensive subjects during cold exposure.

Polarwrap, Inc. continued their support and funding of cold temperature research with a project on blood pressure responses when medicated hypertensive subjects were exposed to the cold. Results indicate that even when medicated for high blood pressure, subjects still experience significant increases in blood pressure measurements when breathing cold air. Numerous research opportunities abound for both graduate and undergraduate students with on-going projects in the lab. We will continue our line of research work in downhill skiing as well as work with nutritional supplements.



Eat Right for Your Heart—Delicious Decisions

Many people focus on eating right to keep their body in shape, which often translates into maintaining a lean body mass. But eating right should also entail keeping your heart healthy enough to perform its functions. Cutting back on foods that contain cholesterol, saturated fat and trans fat and limiting sodium or added sugar is a great start. Aim for a diet rich in vegetables, fruits and whole grains and select lean meat and low-fat dairy products. The following websites from the American Heart Association and the National Institute of Health contain heart-healthy recipes for you to try.

AHA's delicious decisions: <http://www.deliciousdecisions.org/cb/index.html>

National Institute of Health: <http://www.nhlbi.nih.gov/health/public/heart/other/syah/index.htm>

Alzheimer's Disease—Where are we now? Dean Stulz, PA-C, MS

This year will mark one century since Germany's Dr. Alois Alzheimer described what is known today as Alzheimer's disease (AD). Currently, 4-5 million Americans are affected and could double by the year 2020. Despite thousands of research studies, no exact cause has been determined or cure discovered. So nearly one century after the first description of Alzheimer's disease, and a multitude of research aimed at finding a cause, a cure, and a treatment, where are we now?

One of several types of dementia, AD is the progressive loss of cognitive ability. The cardinal feature of dementia is memory loss. As the disease spreads through the brain, the AD patient experiences a diminishing ability to perform activities of daily living, displays behavioral disturbances, and language impairments. Diagnosis of AD during early stages is important because early recognition and treatment can delay cognitive decline. An evaluation for AD involves a complete physical, neuropsychological examination, neuroimaging, laboratory studies, and an extensive history from the patient and family members or close contacts.

Build-up of free radicals and/or plaque in brain blood vessels are thought to be reasons some people develop AD. Living a highly physically active life, getting adequate anti-oxidant vitamins (A, C, and/or E) to prevent free radical formation, replacing saturated fats with mono-saturated fats in one's diet to reduce the risk of plaque build-up and controlling stress and blood pressure are all thought to reduce the risk of AD.

Fruits, veggies and low fat dairy are good sources of anti-oxidant vitamins. Practical ways to replace saturated fats would be to use skim instead of whole milk, olive oil instead of vegetable oil/shortening and lean (fish, chicken) instead of fatty meats (bacon, ground beef, sausage). Being physically active can help control blood pressure and even drinking an occasional glass of red wine is considered therapeutic. All these lifestyle habits ultimately reduce the risk of damage to brain tissue, and hence AD.

The only FDA approved pharmacologic treatment for AD is cholinesterase inhibitors. These medications slow the progression of cognitive decline. Non-pharmacologic treatments such as structured routines, and providing clues and reminders can help manage behavior problems and decrease stress for the AD patient. These non-pharmacologic remedies help the AD patient retain self-respect and dignity while dealing with the conscious loss of cognitive ability.

So nearly one century since the first description of Alzheimer's disease, no single factor has proven to be the precise cause of AD, and no one treatment has proven to provide prevention or cessation of AD symptoms. Despite these shortcomings, our understanding of AD has grown immensely and with continued research and diligence, a cure may be found for this debilitating disease of the elderly.



About the Author: Dean Stulz earned a Master's of Science Degree in Exercise Physiology in 1997 from St. Cloud State University. He then joined the Active Duty Army to continue doing human physiology research. After the birth of his 12-week premature daughter, and seeing the incredible work done by the doctors and caregivers, Dean experienced a renewed desire to practice medicine and subsequently applied for the Army's Interservice Physician Assistant Program. Today he is a certified Physician Assistant for the US Army and currently deployed for Operation Iraqi Freedom. He and his wife, GeNae, have two children—Kaylee, 7, and Hunter, 5.



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THANK YOU, THANK YOU, THANK YOU!!!!



The staff and students at the HPL 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. We thank the following people who made contributions to the Adult Fitness Program in 2006.

Dave and Nancy Bacharach

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SCSU Foundation-Adult Fitness

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HPL Staff (left to right): Barb Kunze, John Seifert, Dave Bacharach, Glenn Street