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Human Performance Lab Newsletter, March 2012

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Human Performance Lab

News & Views

Department of Kinesiology, Health and Physical Education

March 2012

Kelly's Corner

David Bacharach

Hello to everyone from the HPL. With the reorganization at SCSU, we are now in a new school and we have a new name. The Adult Fitness Program and HPL are now part of the Department of Kinesiology, Health and Physical Education. Nevertheless, we are still here, with our eyes on the future. Both Prof. Glenn Street and I are back at it full time. This fall we attended several planning meetings addressing the renovation of Eastman Hall. Preliminary 5 yr plans are to develop Eastman into a complete health and wellness facility on campus. The building would house Student Health Services, Counseling Services, Health Education, U-Choose and the HPL. The main floor would serve students and community members with an open foyer, lounge, coffee shop and cafeteria. Having a classroom, expanded locker room facilities and approximately 25% more space than we currently have makes the potential move quite attractive. Eastman is the last remaining building on campus that has exposure to the river and our current administration would like to meld the scenic aspect of Eastman's location with the health promotions perspective of its occupants. It could become a win-win scenario; but, we'll have to wait a while to see if it becomes reality.

In the meantime I could not help but get excited about the current emphasis being placed on "moving". Or perhaps a better phrase is, "not sitting". Recent articles have been so bold as to state, "...sitting is the new smoking...". The notion behind this concept is simple. Most Americans now sit longer than they sleep. We sit for an average of 10 hours per day. Sitting for extended time periods is a risk factor for chronic disease, just like smoking, high cholesterol, high blood pressure or being overweight. One doesn't have to look very far to find high-tech treadmill desks or potential quick fixes like exercise balls replacing desk chairs. Other initiatives are simply advocating for strategies to get people out of their chairs every few hours. If we were to get up every hour and walk for five minutes, we would walk an average of 50 minutes each day. So, set your alarms, write one less email to a coworker that is in your building, hide the TV remote and get out of that chair. Moving is good for us all. We have known that for years and it only confirms what the HPL set out to do 40+ years ago: stay active, eat well, take care of ourselves, live the best we can and be thankful for all that we can do.



Vitamin D in the Winter

Steven Milkovich

The winters of Minnesota can often hinder our ability to enjoy the outdoors. Believe it or not, being able to get outside on a regular basis can have positive effects on one's health. Being exposed to sunlight helps our body synthesize vitamin D, a critical nutrient for maintaining strong and healthy bones. Exposure to sunlight is the main source of vitamin D for a majority of people. As one can imagine, it is common for Minnesotans to decrease their outside activities in the winter. This coupled with the shorter days of winter can cause deficiencies in vitamin D. Given these trends it is important for us to find alternative sources of vitamin D during the winter to offset our potential deficiencies.

The current RDA recommendation of vitamin D for males and females ages 1-70 yrs is 600 IU or 15 mcg. Unfortunately, vitamin D does not occur naturally in many foods. Fatty fish such as swordfish, salmon, tuna (3 oz.) and cod liver oil (1 tablespoon) are known for their high vitamin D content, as are some mushrooms. For this reason vitamin D is fortified in many types of milk (1 cup), yogurt (6 ounces), margarine (1 tablespoon), cereal (.75-1 cup) and fruit juices (1 cup). Liver (3 oz.), beef (3 oz.), and egg yolks also have small amounts of vitamin D. Additional foods containing vitamin D can be found at the USDA's website at usda.gov or choosemyplate.gov. If finding it through your nutrition is not an option, one can always consider taking vitamin D supplements. As with any supplement consulting with a health care provider before taking them is a wise move.

While winter may limit our time in the sun and production of vitamin D, there are some simple ways to help offset deficiencies we may experience in these cold winter months. Keeping up on your vitamin D is just one step in maintaining a happy and healthy life.

- Office of dietary supplements. (2011, June 24). *Dietary supplement fact sheet: Vitamin D*. Retrieved from <http://ods.od.nih.gov/factsheets/vitaminD>



First Year Graduate Students

Steven Milkovich is native of Ely, MN. He earned an exercise science degree at the University of Minnesota, Duluth. He was an assistant track coach at UMD, and is serving the same role here at SCSU. He is currently working on his master's in exercise science with concentrations in physiology and biomechanics.

Kyle Miller is from White Bear Lake, MN. He obtained his undergraduate degree at Bethel University and is pursuing a master's degree in exercise physiology.



Emily Willaert is from Mankato, MN and did her undergraduate degree at the College of Saint Benedict. She helped coach the Apollo girls soccer team this past fall and coaches for the MN Olympic Development Soccer Program. She is pursuing an internship for the summer in biomechanics and exercise physiology.

Kelley Holmes comes from Omaha, NE and did her undergraduate studies at St. Catherine University. She hopes to intern this coming summer in cardiac rehabilitation; her field of graduate study. This past summer she completed her first half marathon.

Kara Mason is from New Ulm, MN, and did her undergrad at Mankato State University. She spent her summer working as a personal trainer at Snap Fitness in North Mankato. She is working towards a degree in cardiac rehabilitation and hopes to pursue a career in this area of medicine.

Upcoming 2012 National ACSM Presentations San Francisco, CA

- ◆ David Bacharach, On-hill Delayed Video Enhances Development in Alpine Skiers during One Week of Summer Camp Training.
- ◆ Kelley Holmes, Emily Willaert & D. Bacharach, Are Aerobic and Anaerobic Capacities in CUSSA Junior Alpine Ski Racers Improving? A Seven Year Follow-up.

CONGRATULATIONS!!

The faculty and staff of the Human Performance Laboratory would like to acknowledge and congratulate the following students who completed their master's degrees in 2011:

Janna (Castellano) Miron
Dennis Madden

Nonsteroidal Anti-inflammatory Drugs (NSAIDs): Friend or Foe? Kyle Miller



While not everyone has heard of non-steroidal anti-inflammatory drugs, virtually everyone has used them at one time or another. Have you ever used ibuprofen or aspirin? Then you've taken NSAIDs. The primary function of NSAIDs is, as the name suggests, to reduce inflammation; however, most NSAIDs are also effective analgesics (pain relievers) and antipyretics (fever reducers). Because NSAIDs can be applied in such a wide variety of situations, it is no wonder they are the single most prescribed drug in the world--annual consumption of aspirin alone is in excess of 40 million kilograms. ¹

In the world of athletics and fitness, NSAID use is rampant, and often unnecessarily so. The most common justifiable application for NSAIDs within the athletic/fitness subsector is injury management. However, use of NSAIDs to reduce or stave off exercise-induced muscle soreness, as many people do, is not at all justifiable. NSAIDs have no effect on muscle soreness ^{2,3,4} and regular NSAID use can adversely affect the cardiovascular, renal, and gastrointestinal systems.

Why NSAIDs do not reduce muscle soreness remains something of a mystery. In the early 1970s, it was proposed that exercise-induced muscle soreness was the result of acute inflammation associated with the sore muscles. ⁵ Despite all the observational evidence pointing toward acute inflammation as the source of post exercise muscle soreness, NSAIDs do not in any way reduce individuals' perceived soreness after exercise. What causes post exercise muscle soreness has yet to be determined.

Perhaps an even greater mystery, though, is the hubbub within the athletic/fitness subsector regarding the potential for NSAIDs to inhibit the protein synthesis (muscle growth) response to resistance exercise. This notion is clearly influenced by a few early 2000's journal articles

which indicate exactly that. ^{3,6} More recent studies, however, suggest the use of NSAIDs has little effect if any on muscle growth. ^{7,8} Even if NSAIDs blunted the increased muscle growth caused by exercise, it would still be a ridiculous reason to stop taking NSAIDs in the face of the far more deleterious side effects of regular NSAID consumption.

One of those profoundly deleterious effects NSAID consumption can have on one's health is significantly higher risk of heart attack and stroke. Under normal conditions, there exists within the body a delicate balance between two opposing hormone like substances which help to properly regulate blood pressure. Consumption of NSAIDs can disrupt this balance resulting in significantly increased systolic as well as diastolic blood pressure--a particularly dangerous side effect for those who may already have high blood pressure. ⁹

Another undesirable side effect: ulcers. In a study done by Allison and colleagues, ¹⁰ nonspecific small-intestinal ulceration was found in 8.4% of NSAID users compared to 0.6% in non users. They also discovered that three of the patients who were long-term NSAID users died from perforated nonspecific small-intestine ulcers.

Despite these possible risks, and the ineffectiveness of NSAIDs to relieve exercise-induced muscle soreness, people continue to take them. While it may not be a wise choice to take NSAIDs for reduction of muscle soreness or daily aches and pains, use of NSAIDs for their anti-inflammatory and analgesic properties during injury management can be beneficial. They can also be used to effectively reduce fever and ease pain during illness. There are countless viable applications for NSAIDs: there's a reason why they are the most prescribed drug on earth. In the end, as with all things (except pizza), moderation is the key.

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Thanks to our Sponsors

Otto Bock donates \$5,000

Otto Bock is the world's leading manufacturer of prosthetic and orthotic devices. In addition to this latest contribution, over the past 12 years Otto Bock has generously funded a number of research and educational initiatives through the Lab with the intent of improving the quality of life of lower leg amputees.

Thank you for your continued support of the HPL!!!



Eagles Club grants \$5,000

St. Cloud Eagles Club Aerie 622 provided the HPL with a Max Baer Heart Fund grant to help purchase a new open-circuit spirometry unit as well as a portable pulmonary function system. The Vacumed Vista MX can measure resting metabolic parameters as well as maximal oxygen uptake. This makes it ideally suited for energy expenditure studies with our adult fitness program participants as well as maximal efforts by our athletic populations. The Med-Graphics CPF5-D is a versatile system for testing lung function. It can measure lung volumes, flow rates, and compare pre and post challenges when determining restrictions or obstructions to airflow. This has been very useful in measuring exercise induced asthmatic-type symptoms in all our programs' participants.



Moderate Intensity Exercise Helps Reduce the Risk of Dementia

Emily Willaert



Current research is indicating that lifestyle choices can play a role in decreasing the likelihood of Alzheimer's and other types of dementia. Regular exercise appears to be one of the greatest reducers and can decrease one's risk of developing Alzheimer's by 50%. Regular exercise can also slow further deterioration in those who have already started to develop dementia. The key to this prevention is working out for at least 30 minutes at a moderate intensity. Thirty minutes seems to be the magic number. Less than that does not appear to have the same benefits and moderate intensity appears to be more beneficial than light or high intensity. The phrase "use it or lose it" seems appropriate for these findings. Exercise stimulates multiple areas of the brain to maintain balance, coordinate movements, regulate temperature, blood pressure and blood flow, as well as interpret incoming senses, and control simple spinal reflexes. With all this stimulation, studies show that individuals who exercise tend to have an increase in the brain's ability to change, better blood supply, clearer connections, greater neuron growth, and neurotrophic factor. All of these are involved in learning, long-term potentiation, cell health and survival and protection from injury. Therefore, adding brisk walking, jogging and/or weight lifting to your regular routine can be not only beneficial for your physical and mental health, but can help maintain your cognitive functioning as well.

For more information: <http://www.fi.edu/learn/brain/exercise.html>

Fitness Trends in 2012 Kelley Holmes



People are always looking for the next “big thing” in fitness; but, a survey conducted by the American College of Sports Medicine (ACSM) with over 2,000 respondents representing a variety of ACSM professionals across many disciplines suggest the top three trends for fitness have not changed much in the past few years. Table 1 lists the top 20 fitness trends for 2012. Trends in this case are defined as changes in peoples’ behavior. Using a personal trainer, learning new ways to improve strength and programs for older adults continue to be at the top of the list. The US has a population base of just over 300 million people and only 25% are considered active. Of the 75 million Americans that are active, an estimated 6 million currently use a personal trainer which is up from 4 million in 2008. While this number may seem small, it does reflect a trend that more people are beginning to use a personal trainer. ACSM has found a rise in the demand for fitness professionals that have some sort of accreditation or extensive knowledge in exercise. The number of certified fitness trainers was about 260,000 in 2008 and is projected to increase 25-30% to about 335,000 trainers by 2018. Personal trainers are a popular option for people with their own personal fitness goals. Personal trainers who are certified and experienced can provide fundamental strategies to enhance quality of life, improve physical fitness, performance, manage health risks, and promote lasting healthy behaviors. For any individual who may be new or looking for a change in their routine, most personal fitness trainers have the tools to help. Depending on the individual, a personal trainer may be a good option. A personal trainer’s knowledge and experience may help someone shake up their routine, develop a new technique or be a quick resource for exercise options.

A topic making its way to the top of the trend list is fitness programming for older adults. There has been a growing interest within the fitness industry to develop specialized programs for older individuals wanting to keep up their fitness levels. Older adults are looking for exercise to help improve activities of daily living or strength exercises to be able to continue to enjoy the activities they do now or possibly did when they were younger.

So, is there a place for enthusiastic fitness routines like “Boot Camp” classes or “Spinning” on the list? ACSM experts predict fitness crazes like these or Zumba may or may not be around long, but consulting qualified fitness professionals will always remain near the top of the priority list for keeping people healthy, fit and safe. It’s too bad there are not more active people. Maybe we should start our own trend; just get more people moving. Wouldn’t that be something?

Table 1: Top 20 Fitness Trends for 2012

- | | |
|--|--|
| 1. Educated, certified and experienced fitness professionals | 11. Yoga |
| 2. Strength training | 12. Comprehensive health promotion at the worksite |
| 3. Fitness programs for older adults | 13. Boot camp |
| 4. Exercise and weight loss | 14. Outdoor activities** |
| 5. Children and obesity | 15. Reaching new markets |
| 6. Personal training | 16. Spinning (indoor cycling) |
| 7. Core training | 17. Sport-specific training |
| 8. Group personal training | 18. Worker incentive programs |
| 9. ZUMBA and other dance workouts** | 19. Wellness coaching |
| 10. Functional fitness | 20. Physician referrals |

**Indicates a top 20 position new for 2011





Single Serving in the New Year? Kara Mason

With New Year's resolutions, many of us may also be thinking of spring and escaping to a warmer climate. Warmer weather means shorts and t-shirts which often transcend to thoughts of diet and exercise. Watching what we eat is a big part of meeting personal goals for weight and body image.

The diet industry is a true connoisseur when it comes to marketing diet gimmicks. A diet fad enjoying current popularity is prepared single serving meals with or without a meal plan. Meals you can buy at most grocery stores include Lean Cuisine, Healthy Choice, Kashi, Smart Ones, or Weight Watchers. Some meal plans that can be delivered include Diet-to-Go, Jenny Craig, NutriSystem, or LA Weight Loss.

Prior to selecting any such option, one should ask oneself: What is in the meal, how much does it cost, do they deliver and are they truly different from self-prepared meals? Keys to determine a well prepared single serving meal include: total calories, fat content (particularly saturated fat), proportion of carbohydrates and proteins (generally 4:1), sodium intake (<2,300mg/day), will it satisfy hunger, and quality of taste. Most single serving meals will have one or two vegetables, a protein source and some kind of sauce or spice. They range in price from

\$2-6 per meal with an extra delivery charge. **But they do not appear to be much different from self-prepared meals other than portion size and sodium content.**



For example, the total daily percentages for a Cheese Ravioli dinner from Jenny Craig containing 250 calories are: 1-3% protein, 13% carbohydrate, 8% fat, and 25% sodium for a 1,000 calorie/day diet. A typical home prepared Cheese Ravioli will have 275-300 calories, 29% protein, 14% carbohydrate, 10% fat, and 73% sodium. The notable differences are in protein and sodium.

Single serve meals strive to be less than 300 calories. they focus on portion control, convenience of a prepared meal and calorie restriction. With this in mind, the portioning for the Jenny Craig

meal is fine, but a diet of 1000 calories per day may not fit most people. Daily dietary intakes below 1400 calories for the average adult will often be lacking in nutrient value.

If single serving meals are part of your diet, but not all your calories come from prepackaged meals, try to include foods rich in nutrients. Low fat proteins, complex carbohydrates, vegetables and fruits



are such nutrient rich foods. Snacks like apple slices with a little peanut butter, a slice of banana bread made with apple sauce and whole wheat flour or granola with yogurt are good choices. A big part of eating properly is planning meals and snacks in anticipation of being hungry. If one can change eating habits, healthy eating behaviors will last a lifetime. Good luck with all your New Year's Resolutions and fitting into your summer clothes.

Physical Activity and the Brain HPL Alumni Feature Dr. Steve Gaskill, 1994

Steve came to us in the early 1990's following a long stint as a US Olympic Nordic Ski Coach. After finishing his MS in exercise science at St. Cloud State in 1994, he went on to earn his doctoral degree in the same field at the University of Minnesota before taking his current faculty position at the University of Montana in Missoula. Thank you for graciously sharing with us some of your recent work on monitoring physical activity levels of elementary and high school students in Montana!



Physical Activity and the Brain (cont.)



Between 2005 and 2009, we monitored the physical activity levels of several hundred 2nd-12th grade students in Missoula, Montana. As shown in Figure 1, we found around half of the 2nd-4th graders were moderately to vigorously active at least an hour a day, four to five days a week. The percentage of active students steadily declined with age, reaching a low of <10% by the time they entered high school. These findings agree with nationwide trends.

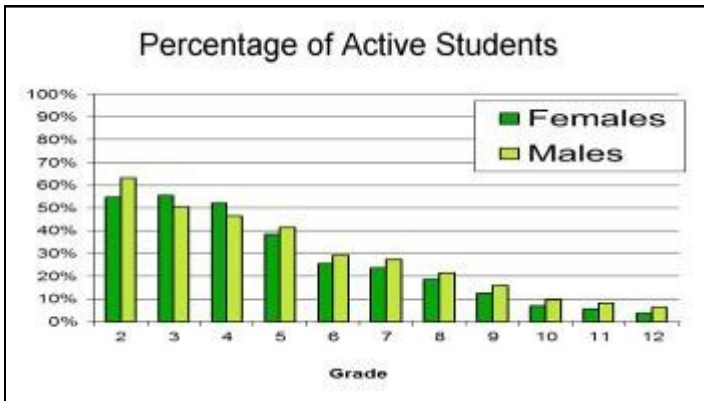


Figure 1: Percentage of students meeting the national guidelines of 60 minutes of moderate (brisk walking) to (jogging or above) vigorous activity, at least four to five days per week.

Of greatest interest to us was the strong relationship we found between physical activity and academic performance, as measured by the Montana standardized test scores (MAP) and grade point average (GPA). As shown in Figures 2 and 3, as students get older, the spread in academic performance increases between the least and most physically active. The most physically active students were the most academically accomplished by MAP and GPA scores, especially at the higher grades.

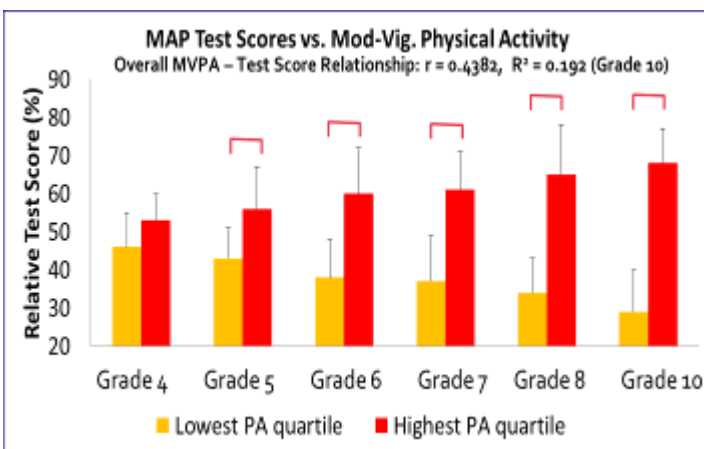


Figure 2: Standardized test scores of the least active (bottom 25%) and the most active (top 25%).

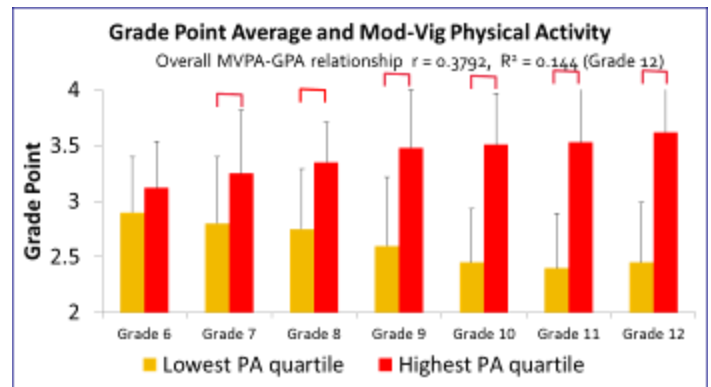


Figure 3: Annual GPA of the least active (bottom 25%) most active (top 25%).

While our study design didn't allow us to conclude that the increased physical activity levels were responsible for the improved academic performance, other studies lead us to believe that they are causally linked. The following list summarizes the results of over 200 research articles that showed physical activity interspersed throughout the school day has a positive effect on academic performance and behavior.

Effect of Physical Activity	Effect Size
Improved Math Performance	***** **
Improved Higher Order Thinking	***** **
Improved Problem Solving	***** **
Improved Attendance	***** **
Improved Memory	***** **
Improved Focus in Class	***** **
Improved Grade Point Average	***** **
Improved Standardized Test Taking	***** **
Reduced Discipline Referrals	***** **

*Stars indicate relative effect size (1-3 Low, 4-5 Moderate, 6-8 Strong, 9-10 Very Strong)

We have recently begun working closely with our local administrators and teachers to meet the goals of having students sit no longer than one hour without a physical activity break, and to have them exercise 30-60 minutes a day in activities that are age appropriate and that the students find enjoyable.

If you have an interest in this area and would like more information, send me an email (steven.gaskill@umontana.edu).

“Exercise is Medicine: We now recognize that it is medicine not only for the body but also for the brain.” - American College of Sports Medicine



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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 2011.

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