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Exercise is Medicine

By Ciaran Fairman MS, HFS, CET, CISSN

The medicinal advances in recent years have been nothing short of impressive. Hypertension? Beta-blockers or diuretics can be used to lower blood pressure. Lipitor can be used to combat high cholesterol. Osteoporosis? Desonsumab can increase bone mineral density and reduce the risk of fracture. The list goes on. Just a few pills a day can cure the majority of ailments or diseases. Where this gets tricky, is when you have all the above, and a few pills a day, turns into 10-15, many with negative side effects, that may even be compounded when combined with other pills. Pharmaceutical drugs treat the symptom, not the cause, and should be an absolute last resort, not a first option.

What if I told you that there is a medication for all the above? A medication, which has been shown time and time again, for years, to improve almost any physiological parameter (immune function, blood lipid profile, bone health, strength, muscle mass, aerobic capacity) you can measure.

There is a wealth of research supporting the role of regular physical activity (depending on the type) in the prevention and treatment of much chronic disease. Moreover, the evidence supporting the efficacy of physical activity to improve quality of life, measures of anxiety, depression and overall mental health is astounding.

Exercise is Medicine is not just a catchy phrase- it really, is medicine. Just like medication alters hormones, chemistry or pathways in your body, so too can exercise. Without going in-depth into physiology and biochemistry - us kinesiologists view exercise just like any other medication. We prescribe it in doses (just like your physician would give you x mg's of a pill), see how you tolerate it, and modify according to symptom response.

Consider the five most common obesity - related diseases: stroke, coronary artery disease, diabetes, hypertension and elevated cholesterol

Current most common treatment - medication/pharmaceuticals

Cost of current medication - ~\$17,000 a person (conservative estimate), low work productivity, low libido, increased sick days resulting in lower income; myriad of side effects as a direct result of medication

Rough estimate of the profit of the weight loss supplement industry - ~\$20 billion and rising

Average cost of a generic, nutrient dense 2,000 calorie diet - ~\$40 a day.

Average cost of gym membership - ~\$300-500 a year.

Benefits of regular exercise and good eating habits - WEIGHT LOSS, Clearer thinking, improved libido, productivity in work (potentially increasing income), quality of life, longevity and overall reduced risk of co-morbidities and mortality

Exercise and Performance Nutrition

Kevin Schill, MS



How does what we eat and when we eat it really affect physical performance?

Your body operates like a machine. It requires the proper fuel and nutrients to achieve the best performance. Timing also plays an important role in maintaining healthy blood levels of certain compounds. For instance it may be advisable to time meals appropriately before long workouts to avoid becoming hypoglycemic during exercise. Additionally, if you are trying to put on muscle it becomes important to make sure you spread your protein intake out over the course of the day and eat consistently throughout the week.

Muscle synthesis can occur for 24-48 hours post exercise.

What has been shown to promote optimal physical performance?

This will depend on the type and intensity of exercise. Carbohydrates, caffeine, and creatine when used individually have all been found to have performance benefits (although they may be small). Lower glycemic index (G.I.) foods will be better in preparation for long endurance exercise, while higher G.I. foods would be better for quick fueling before short, intense exercise.

Protein Supplements

Supplements are just that – supplements. They cannot and should not replace the nutrition found in whole foods and a balanced diet. With regards to protein it may not be practical or cost effective for some people to get everything from food alone. Protein requirements for those trying to build muscle, or more importantly maintain muscle during a caloric restriction, are probably higher than most people recognize – typically around 1.6-1.8 g/kg, and even higher in some cases. For someone my size (180 lbs) that amounts to 130-145 grams of protein a day which may be hard to do on food alone.

If you do decide to include a protein supplement in your diet make sure it contains some of the branched chain amino acids (leucine, isoleucine, and valine) as these have been linked to pivotal steps in protein synthesis. Additionally there is something called the PDCAAS (protein digestibility corrected amino acid score) that has been adopted by the FDA as the preferred method to determine protein quality. Good examples of quality protein include casein and whey (milk protein), egg whites, and soy.

How should someone fuel before and nourish after the following exercises?

Prior to any exercise of at least moderate intensity (an easy jog) you should ingest some carbohydrate, a small enough amount that will not provide stomach discomfort. Even though during moderate activity most of your energy will be derived from lipid (fat) oxidation, we like to say “fat burns in a flame of carbohydrates”. You are also almost always burning a mixture of fuels. Eating higher G.I. foods (white bread, sugar) will be better at raising your blood sugar levels in preparation for intense exercise. Staying hydrated is very important regardless of intensity. Drink at a rate that is comfortable and practical to replace most of the fluid you will lose by sweating.

-Short Aerobic Exercise (0-30 minutes)

Primary concern here is staying hydrated. Exercise of this duration will not require carbohydrate provision.

-Medium Aerobic Exercise (30-60 minutes)

Primary concerns here are staying hydrated and some carbohydrate support. Most sports drinks, such as Gatorade, contain concentrations of carbohydrate that support optimal water and carbohydrate absorption. The general recommendation is 30-60 grams of carbohydrate per hour (21 grams in a typical Gatorade).

<i>Protein Source</i>	<i>PDCAAS (%)</i>
Casein	100
Egg white	100
Soy protein	100
Beef	92
Fruits	76
Vegetable	73
Legumes	70
Cereals	59
Whole wheat	42

Exercise and Performance Nutrition..continued

-Longer Aerobic Exercise (60 minutes +)

Starting at 60 minutes you will want to ingest additional carbohydrate when you exercise if you plan on going for long distances or times. Electrolyte replenishment is important too. Solid food (energy gels, bars) will be better at relieving any hunger feelings you experience. Remember: 30-60 grams of carbohydrate every hour with fluid replacement as well. Caffeine (at very low levels) has been proven to increase long duration endurance performance so adding that may be a good idea if your body can tolerate it.

-Resistance training (weights, yoga, pilates etc)

Eating a meal containing carbohydrate and protein both before and immediately after this kind of exercise has been shown to optimize training adaptations. There is research showing that doing so increases the production of anabolic hormones that increase muscle building. Interestingly enough, chocolate milk usually has the optimal ratio of carbohydrate:protein (3:1) for muscle recovery.

-High Intensity Interval Training (H.I.I.T.)

Interval training at high-intensity is an efficient way to exercise and increase fitness. It will be especially important to replace fluids and eat carbohydrate when exercising at this intensity. HIIT will also increase the amount of protein breakdown in your muscles so make sure to eat a recovery meal.



FSFP Holiday Reminders:

Monday 12/8/2014-last day for water aerobics/pool use till 1/12/2015

Monday 12/22/2014-last day for yoga

FSFP will be closed to observe university holidays-12/24/2014, 12/25/2014 and 1/1/2015.

Check out what our Members have been up to....

By Emily Martini, M.S.



Our Early Morning Crew....getting their workouts on: Linda Emmenegger, Jacqueline Williams , Mary Kerr



Nancy proving that Exercise is Medicine, she is now able to control her blood pressure through diet and exercise!



Father Vinny sharing his secret to staying young and fit.



Brothers in life and HEALTH!!! The Shearer brothers making workout time family time!!

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FACULTY & STAFF
**FITNESS
PROGRAM**

FOCUS ON RESEARCH-CIARAN FAIRMAN

EXERCISE IS MEDICINE FOR CANCER



There is a wealth of research supporting the role of regular physical activity (depending on the type) in the prevention and treatment of many chronic diseases, including cancer. Almost any physiological parameter (immune function, blood lipid profile, bone health, muscular strength, muscle mass, aerobic capacity, etc.) you can measure can be improved with regular physical activity. Moreover, the evidence supporting the efficacy of physical activity to improve quality of life, measures of anxiety, depression and overall mental health is astounding.

Despite the well-supported benefits of physical activity in cancer care, the majority of patients and survivors do not engage in sufficient levels of physical activity. Often times, the most difficult part of getting cancer survivors and patients to engage in physical activity is a lack of awareness. There is huge disconnect between how far the research has progressed and what we know is safe and effective, and what survivors are actually aware of.

Ciaran, a doctoral student, has come up with a way to combat this. Recently, Ciaran set up REACH, with the sole purpose of acting as the missing link between the latest research and cancer survivors.



REACH, is a non-profit organization aimed at breaking down scientific research into usable information for cancer patients both during, and after treatment. REACH offers easy-to-understand information on the latest research through blogs, photos and videos on [Facebook](#) and their [website](#). The organization also offer free online consulting for survivors interested in beginning an exercise program.

REACH is also currently selling garments with our logo on it to spread awareness of the organization, and to raise funds that will help purchase a better camera to improve the quality and content of the videos. You can find the link to the donation site by clicking [here](#).

Additionally, Ciaran has an array of resources for anyone interested in gaining more information on physical activity and its role in cancer survivorship. Please feel free to visit the links below, or contact Ciaran directly for more information.

Website: <http://reachformore1.wix.com/reach>

Facebook: <https://www.facebook.com/pages/REACH-Research-in-Exercise-And-Cancer-Health/314246698740556?>

E-book on Exercise and Cancer: <http://www.theptdc.com/2014/10/exercise-advice-for-cancer-survivors/>

Ask the Expert

By: Dr. Steven T. Devor, Ph.D., FACSM

I believe it is worth noting that one of our nations greatest thinkers and inventors (and native Ohioan), Thomas Edison, firmly believed that great ideas and thoughts originate in the muscles. And he was convinced that his greatest ideas came to him when he was active. A true mind body connection, something to consider.

Contributed by Dr. Steven T. Devor – Director of Performance Physiology for MIT and OhioHealth, and Associate Professor of Exercise Physiology, Department of Human Sciences, and Department of Physiology and Cell Biology, The Ohio State University

As healthy active runners many of us believe being physically inactive is something we need not worry about. However a large amount of important and recent research focused on the daily amount of non-exercise physical activity, (i.e., time spent simply moving around), indicates those who exercise, even runners, sit for several hours during the day after their workouts. In fact we now know that on the day of a workout for a consistent exerciser there are often less overall minutes of accumulated physical activity than on a day when no formal structured exercise is completed. In other words, we tend to have less overall physical activity on days that we workout than on days we do not workout. Simply put, in society today we sit more than any previous generation, and research indicates that on average adults spend more than nine of their waking hours per day in sedentary activities.

Recently, scientists with the National Cancer Institute followed approximately 250,000 adults in America for eight years. All of the study subjects were required to answer detailed surveys to understand how much time they spent each day commuting in a car or bus, watching television, sitting before a computer, and doing daily structured exercise. Questions were also asked to understand the state of their general health and well being. At the start of the study none of the subjects suffered from heart disease, any type of cancer, or diabetes.

To the surprise of the investigators, at the conclusion of the eight year study many of the participants were sick and a number had died. Interestingly the sick and those that had died were almost always very sedentary. Further, those who indicated they viewed television for greater than seven hours a day were at a much higher risk of premature death compared with the subjects who sat sedentary viewing less television.

Perhaps most important for those of us that exercise or run daily, is the research clearly indicated the daily routine of going to the gym or running only slightly lowered the negative health risks that are highly associated with hours of daily sitting. Indeed, those who reported doing structured exercise for seven hours or more a week (an average of 60 minutes every day), but that also spent at least seven hours a day in front of the television or computer, were more likely to die prematurely than those who exercised seven hours per week but watched less than an hour of television per day.

I want to be clear. It is very possible to have a high level of structured physical activity, for example running for 60 minutes per day, but still spend most of your daily waking hours sitting. You sit during your commute to work. You sit in front of your computer. You sit in meetings. You sit eating meals. You sit and watch television. You sit at the movie theatre. You sit playing video games on your game console or smart phone. You sit reading.

From an overall day long physical activity perspective, it is very possible to get in your structured workout, yet still be highly sedentary; what I refer to as an “active couch potato” Increasingly large amounts of carefully done research indicate that while consistent daily structured exercise is clearly beneficial to your health, it does not fully counteract the highly negative effects of sitting. In my opinion, too much daily sitting is the new smoking.

A recent research publication from Australia utilized a powerful statistical analysis to determine that every hour an individual spends sitting still watching television, will subtract approximately 22 minutes from their life. Considered over an entire lifetime, this would mean that if a man with an average life span never viewed television, he would live approximately 2.0 additional years, and a woman that watched no television might live approximately 2.2 years longer.

Another recent study investigated how sitting can influence both glucose and insulin levels in the blood. The study required 19 adult subjects to do one of three things for seven hours on three separate days. On day one the subjects were required to sit completely still for the entire seven hours. On day two the subjects had to rise from their chairs once every twenty minutes and walk slowly on a treadmill for two minutes. Finally, on day three the subjects had to get up from their chairs every twenty minutes and run slowly during their two-minute intervals.



When the subjects remained seated for the entire seven hours, their blood glucose and insulin both spiked well above normal levels. However, when the sitting hours were interrupted every twenty minutes with movement their blood glucose and insulin levels remained normal. Importantly, neither walking nor running was more effective with regard to lowering blood glucose and insulin. What was critical was simply breaking up the long sustained hours of sitting. Additionally, and important for those interested in weight loss or maintenance of weight loss, on the days when the subjects walked or ran for the two minute intervals they burned hundreds of additional calories over the seven hour period.

So what exactly causes prolonged sitting or sedentary behavior to be so detrimental to our health? Research is providing an increasingly clear picture that all of the sitting we do decreases blood circulation in our skeletal muscles, and at a cellular level our bodies begin to decrease metabolic activity. One very important enzyme in particular, lipoprotein lipase, has been clearly shown to decrease activity during prolonged periods of sitting. Lipoprotein lipase is responsible for the breakdown of fat, and if its activity is lower in your skeletal muscles fat is either stored or pushed into the bloodstream rather than being broken down for use as a fuel.

Studies done in both rats and humans reveal that lipoprotein lipase activity is significantly lower in rats when they are prevented from moving as they typically would in their cages, and in humans when they are required to sit for more than 30 minutes. Inactive animals and humans demonstrate evidence of both insulin resistance and higher levels of fat in their blood. Increased fat levels in the blood are the result of the low activity of lipoprotein lipase associated with inactivity. Lipoprotein lipase activity is only heightened when we are standing, moving around, or active.

Although this important line of research is eye opening, there are easy remedies for this problem. As an active couch potato, it is as easy as moving around more, or even simply standing once every 30 minutes. The simple act of rising from your chair once every 30 minutes will keep the activity of lipoprotein lipase heightened in your skeletal muscles.

My advice is to set a reminder on your computer screen to go off every 30 minutes, and then stand up and move around your office or home. Or at least simply stand and stretch for 15 seconds. It is important that we all become significantly more conscious about how we spend our non-formal exercise time. In my opinion everyone should actively seek opportunities to reduce daily sitting time and move more often over the course of the day.

Finally, I believe it is worth noting that one of our nations greatest thinkers and inventors (and native Ohioan), Thomas Edison, firmly believed that great ideas and thoughts originate in the muscles. And he was convinced that his greatest ideas came to him when he was active. A true mind body connection, something to consider.

