CIHP
Central Institute for Human Performance

THE CENTRAL INSTITUTE FOR HUMAN PERFORMANCE

RESULTS. NO EXCUSES JANUARY 2009

The Foot - A Work of Art

Jacob Stegmaier, DC

Leonardo Da Vinci once said, "The human foot is a masterpiece of engineering and work of art." If this is true then why do more than 70% of all people in the US have painful foot problems at some point during there lifetime?

What do you think of when you think of the foot? You probably think of calluses, bunions, hammer toes etc… Although these are common conditions that affect the feet did you know that the human foot is a highly specialized structure that contains 26 bones, 33 joints, 20 muscles, over 100 ligaments and a complex network of nerves and blood vessels. These parts work together to provide the body with support, balance and most important, mobility. A structural flaw or poor function can result in the development of problems elsewhere in the body.

The foot's primary function while walking or running is shock absorption. This is crucial considering that the average foot strikes the ground close to 15,000 times a day, absorbing nearly 640 metric tons of pressure. It becomes clear that the foot's ability to cushion these ground reactive forces plays a vital role in preventing injury.

What effect could all of these constant forces have for the average person or especially the competitive athlete? Given time the body will eventually develop a compensating pattern that will provide a way for you to move. However, this compensation does not come without a price and that price is usually pain. The results of these compensating patterns can manifest in the feet or as mentioned before other parts of the body, such as, the knee, hip, low back, shoulder and even as high as the neck.

Another way the body and/or foot can develop problems from the foot is through injuries, with ankle sprains being one of the most undertreated injuries of the foot. So often I see foot or foot-related problems linked to someone who had a previous ankle sprain. If this is not treated properly it can affect the way the foot absorbs the forces of everyday walking and can have lasting effects on the rest of the body.

So when encountering a callus, bunion, hammer toe or symptoms such as plantar fasciitis or heel pain …. don't disregard these conditions as normal ailments that everyone has, ask yourself "why" are these occurring. The body is usually trying to tell you that something isn't working as it should. I would agree with Da Vinci's observation, that the foot is a work of art, yet if not cared for, it can depreciate rapidly.

The Doctor's Perspective

Gary Gray, a leading educator in the physical therapy field, coined the phrase "when the foot hits the ground, everything changes." This is certainly true and the change that happens when the foot meets the ground can be good or not so good. I am often amazed when a patient with back pain of 8 years, or an elite athlete, fails the simple test of standing on one leg. If when standing on one leg you have trouble maintaining your foot on the ground, then every step and especially athletic steps become a traumatic event for the knee, hip and back. So, indeed, the foot bone is connected to the leg bone, and then some.

Dr. Clayton Skaggs

Aerobic vs Anaerobic Training

Alexandra Bernardin B.Sc.

One of the most common 'gym myths' that still lingers even to this day is that one must do aerobic work in order to lose body fat. Walk into any commercial gym and you will see equal or more cardio to weight training equipment. What is interesting, and you can check me on this, the people using the weight lifting area are predominantly leaner. That's right, most of the people wearing out the cardio machines are fatter. Here's why.

The most popular argument for aerobic training is that more fat is burned as its fuel source than anaerobic training. Let's define aerobic exercise as continuous, low intensity, long duration exercise; the common heart zone being 60-85% of maximum heart rate. As for anaerobic training, it alternates bouts of high intensity, short duration exercise with active recovery which is low to moderate in intensity; the common heart zone being 85-100% of maximum heart rate . Angelo Tremblay, Ph.D., Physical Activities Sciences Laboratory, Laval University, Quebec, Canada compared the impact of aerobic and anaerobic exercise on fat loss. The aerobic group progressed to 45 minute sessions while to anaerobic grouped progressed to fifteen 30 second intervals and five 90 second intervals over 15 weeks. Even though the research confirmed that more calories where burned in the aerobic group compared to the anaerobic group, the anaerobic group lost more subcutaneous fat than the aerobic group. When the energy cost was taken into account, the anaerobic group lost 9 times the amount of fat per calorie burned compared to the aerobic group. How is this possible? Post-exercise recovery is greater with high intensity exercise compared to low intensity exercise i.e. you keep burning extra calories for up to 48 hours after you are finished working out. Also, the metabolic adaptation to high intensity interval training leads to better lipid utilization (fat burning) and insulin sensitivity (carbohydrate utilization) post exercise. The bottom line is you burn more fat in less time with anaerobic work. If you are still skeptical, let me ask you this, who is leaner, a sprinter or a marathon runner?

Another popular for doing aerobic work is increase in cardiovascular fitness. Maximal oxygen uptake, VO2 max, is regarded as the best measure of aerobic fitness. However, in most sports, along with a good VO2 max, an athlete needs to have an even better anaerobic capacity. In other words, as the intensity of the exercise increases beyond your maximal oxygen uptake, your ability to keep performing with decreasing amounts of oxygen and rising levels of lactate is called anaerobic capacity. It is by maximizing the anaerobic qualities that we can attain the limits of a sporting performance. A good example is that last sprint to get to the ball for a last chance to score a goal at the end of a soccer match. The efficiency to reach maximal levels of intensity in a fatigued state best defines anaerobic capacity. It becomes quite clear that merely developing one's endurance system will not yield optimal results in the sports performance world; both VO2 max and anaerobic capacity need to be high to achieve high performance . Tabata et al. (1) compared the effects of moderate-intensity endurance (MIG) and high-intensity intermittent training (HIIT) on V02max and anaerobic capacity. The MIG group increased their VO2 max by about 10% without any improvement in anaerobic capacity. The HIIT group improved their VO2 max by 14% in addition to increasing their anaerobic capacity by 28%. The HIIT group actually improved both anaerobic and aerobic capacity at the same time!

Finally, when comparing the two major types of cardio-vascular training, the anaerobic systems leads to significantly more advantages. **In any performance training endeavor, quality and intensity will always yield better results than**

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quantity and low intensity. The performance of a High Intensity Interval Training (HIIT) session provides a more efficient way to strengthen your cardiovascular system and use your fat stores for energy. Now of course, an untrained person should never just jump into a HIIT program. Like in anything, progression is everything! For those that fall into the advanced category, HIIT offers a sport-specific way to develop speed and overall fitness.

When in doubt and pressed for time, go for that intense sprint interval and leave the long and tedious brisk walk for those who can't cope with hard work.

1. Tabata, I., Irishawa, K., Kuzaki, M., Nishimura, K., Ogita, F., and Miyachi, M., Metabolic Profile of High-Intensity Intermittent Exercises. Medicine & Science in Sports & Exercise, 29(3), 390-395, 1997.

2. Tremblay, A., J. Simoneau, and C. Bouchard, Impact of Exercise Intensity on Body Fatness and Skeletal Muscle Metabolism. Metabolism.43:814-818, 1994.

3. Perry C.G., Heigenhauser G.J., Bonen A., Spriet L.L., High-intensity aerobic interval training increases fat and carbohydrate metabolic capacities in human skeletal muscle. Appl Physiol Nutr Metab. 2008 Dec; 33(6):1112-23.

CIHP Client Keith Tkachuck Named to NHL All-Star Team

Keith Tkachuck has been named to the Western Conference All-Star Team. This is Keith's fifth All-Star game and second time as a member of the St. Louis Blues. Keith has played 1,094 NHL games, scored 514 goals, and registered over 500 assists. He is one of only four St. Louis Blues players in history to score over 1,000 points for his career. The All-Star game will be played Sunday, January 25 in Montreal, Quebec. Congratulations to Keith on his remarkable accomplishment.

The Karel Lewit Clinic Welcomes Dr. Jacob Stegmaier

Dr. Stegmaier received his Bachelor in Life Science degree from Logan University and his Doctorate degree from Logan College of Chiropractic in Chesterfield, MO.

Dr. Stegmaier has certifications through the Motion Palpation Institute and the Central Institute for Human Performance. He has post-doctoral training in spine stabilization and foot and ankle rehabilitation. He has worked with professional Squash athletes and professional dancers. He has special interests in foot/ankle injuries and rehabilitation. He is a native of Chicago and enjoys running, the outdoors and spending time with his fiance Sarah.

CIHP Calendar

January 31, 2009

CIHP staff will attend the Health and Fitness Lifestyle Event held at Frontenac Plaza

February 12-13, 2009

Dr. Skaggs will be the keynote speaker at the Rehabilitation Institute of Chicago, Northwestern University.

February 19-22, 2009

Dynamic Neuromuscular Stabilization course featuring Pavel Kolar PT, Paed from Prague. Doctors and physiotherapists from around the world will be in attendance.

March 19-21, 2009

Drs. Skaggs and George will travel to Las Vegas for an international research conference to present their work on carpal tunnel syndrome in the pregnant population.