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Exercise is Good for the Gut

A study of professional athletes published recently in the journal *Gut* has found a benefit to the microbial diversity of the human gut through intense exercise. The researchers think that diet plays an important role as well. Specifically, protein intake was also significantly higher among the athletes, and correlated positively with gut biodiversity.

Professional rugby players in Ireland were matched to controls based on age, sex and (for half of the controls) BMI. Fecal samples were collected from the 80 subjects for analysis, and participants filled out food-frequency questionnaires. The diversity of gut microbiota was significantly higher among the athletes than controls. This is looking to be of increasing importance to health

In December patients with colorectal cancer were found to have a narrower range of fecal bacteria, according to a study in the *Journal of the National Cancer Institute*. Researchers analyzed bacterial DNA from fecal samples that were collected roughly 25 years ago in a case-control study of patients with colorectal cancer. There were 47 colorectal cancer patients and 94 controls.

The control group was comprised of patients undergoing elective surgery. Samples were collected after confirmation of the diagnosis, but before therapy. Taxonomic classification to microbial genomes was confirmed and differences adjusted for false discovery rate.

Patients with cancer had decreased overall diversity of bacteria in their gut relative to the controls. For example, they had a lower relative abundance of *Clostridia* species, but an increased presence of *Fusobacterium*.

Since this and similar findings suggest a beneficial role for diversity of microbiota in preventing colorectal cancer, intense exercise may turn out to be somewhat protective from cancer onset. In the present study of athletes, plasma creatine kinase—a marker of extreme exercise—as well as inflammatory and metabolic markers differed significantly between the rugby players and controls. But the athletes also had 22 distinct phyla of gut micro-organisms, a high count which, again, was also positively correlated with higher protein consumption. Many more studies are needed to confirm a link and it is important to keep in mind that certain dietary extremes—most notably increased protein intake—also appear to be involved.

Gut, doi:10.1136/gutjnl-2013-306541

J. Natl. Cancer Inst., Dec. 2013, djt300doi: 10.1093/jnci/djt300

Risk of Hearing Loss in a Common Pill?

A Harvard study published in the *American Journal of Epidemiology* has found a possible link between over-the-counter pain reliever use and, of all things, hearing loss. The unusual nature of this connection poignantly reminds us that unforeseen consequences can accompany long-term use of just about any medication.

In the study, frequent use of ibuprofen (e.g., Advil, Motrin) or acetaminophen (Tylenol) among female subjects was associated with more hearing loss. “Frequent use” was defined as twice a week. Most notably, more frequent use increased the risk by up to 24%. The findings are similar to a study of men and hearing loss, although aspirin was also found to contribute to risk in that study.

The theory right now is that ibuprofen can reduce blood flow to the cochlea, the familiar snail-shaped organ for hearing in your ear. In the case of acetaminophen, it is thought that the antioxidant glutathione may become depleted. Both of these outcomes could lead to cochlear damage—the former from cell death, the latter because the antioxidant specifically protects the cochlea from damage.

It’s important to take medications only as needed, and to avoid falling prey to blind habits and overuse. Now that the American Medical Association has declined to recommend a daily baby aspirin as cardioprotective for the general (older) public, despite heavy lobbying from that industry, we may be seeing a shift at last away from pharmacology-as-panacea. To be sure, o.t.c. medicines do provide good pain relief for many people, and need not be scorned or ruled out as an option for a vast number of temporary ailments. However, frequent use of these medications and use over long periods of time may increase the risk of hearing loss and may cause other adverse health effects. Therefore, it is important to take these medications mindfully and to limit their use as much as possible. As always, talk to your doctor before making any changes in your medication use.

Hearing loss may be a somewhat underreported problem in the U.S. The CDC says that only 39% of adults have had a hearing test in the last three years. Most of us have likely suffered some hearing loss already, if only by virtue of the routine loud noises all around us. And yet hearing loss is a largely preventable problem.

Music is one such common noise source, all too easy to forget to turn down. Runners, cyclists and skaters who routinely amp up with earphones and a favorite playlist, beware of cranking that volume too loud. Workout volumes tend to be on the loud end of the spectrum, but this is not only harmful to your hearing, it can be distracting and isolate you from important environmental cues. Car horns, the polite calls of passing cyclists and many other stimuli should not go unheard, for everyone else’s safety as much as for your own.

Am. J. Epidemiol., 2012, doi: 10.1093/aje/kws146,
<http://aje.oxfordjournals.org/content/early/2012/08/29/aje.kws146.abstract>

Pulled Hamstring? Try These Stretches

The third installment of our 2014 injury series continues with a malady many have experienced at one time or another: a pulled hamstring.

Symptoms of a pulled (strained) hamstring are tightness and pain when you apply pressure to it or the associated muscle group. The hamstring is really a group of three muscles that originate at the *ischial tuberosity* and run along the back of the leg until they connect with bone just above the knee. The ischial tuberosity can be thought of as the part of the pelvis you feel when you sit down. Because the muscle group spans both the hip and the knee, the hamstring responds to two sets of forces from top to bottom, serving both hip extension and knee flexion.

The section of hamstring near the hip (the proximal hamstring) and the lower section near the knee (distal) both have poor blood supplies. The middle section has excellent blood supply and therefore heals much more quickly. The complicated infrastructure of the hamstring muscle set necessitates that it and the muscles supporting it remain strong and flexible to reduce injury risk.

A hamstring strain usually means you've pushed too hard and often can mean you've ignored various pain cues. When you feel hamstring pain, stop. It's not a good idea to try and push through it. Rest the muscle group and ice aggressively, four to six times per day for 15 minutes at a time if possible. After two or so days, gently begin working through the following stretches:

Standing Hamstring Stretch

Place your right foot on a bench or secure chair. With your right leg completely straight and left leg slightly bent, stand tall with your hands on your hips. Without rounding your lower back, bend at the hips and lower your torso until you feel a comfortable stretch. Bending the planted leg more increases the stretch at the hip; keeping it straight increases the stretch at your knee. Rotating the toes of the stretched leg outward works the inner hamstring; rotating toes inward works the outer portion. Hold the stretch for 30 seconds on each leg, then repeat twice more.

Lying Glute Stretch

Lie face-up on the floor with your knees and hips bent. Cross your left leg over your right so the left ankle sits across your right thigh. Grab your left knee with both hands and pull toward the middle of your chest until you feel a comfortable stretch in your glutes. Hold for 30 seconds, then repeat on the opposite side. Repeat two more times for a total of three sets. As with the standing hamstring stretch, you can do this stretch several times a day if you're really tight.

An *American Journal of Sports Medicine* study found that seven out of 10 athletes with recurring hamstring difficulties had muscle imbalances between their quadriceps and hamstrings. After correcting this by strengthening the hamstrings, every person in the study went injury-free for the duration of the 12-month follow-up. All the muscles of the lower body work together and must remain strong, flexible and balanced. Strengthening only your hamstrings, therefore, is as ill-advised as neglecting them. Preventing hamstring injury can involve stretches like the following for your glutes, hip flexors, quads, core and the hamstrings themselves:

Reverse Hip Raise

lie chest-down on the edge of a bench with your hips hanging off. Lift your legs together until your

thighs are in line with your torso. Squeeze your glutes as you lift your hips. Pause, then lower to the starting position. A variation of this exercise involves lying on an exercise ball with your hands to the floor for stability.

Back Extension

Hook your feet under the anchors of the back extension station and, keeping your back naturally arched, place your fingers on the back of your head and lower your upper body as far as you comfortably can. Squeeze your glutes and raise your torso until it's in line with your lower body. Slowly lower your torso back to the starting position.

Dumbbell Step-up

Holding a pair of dumbbells at your sides, stand in front of a bench and place your right foot firmly on it. The step should be high enough that your knee is bent 90 degrees. Press your right heel in and step up until your right leg is straight and you're standing on one leg. Lower your body back down until your elevated left leg touches the floor. Repeat for 10 to 15 reps with the right leg, then move on to the left leg.

The Athlete's Book of Home Remedies by Jordan D. Metz, MD, 2012, Rodale, New York, NY, pp. 60-65

The Latest from the Sports Foods Front

By Nancy Clarke, MS, RD

Are there special nutrients or components of food that can really help runners go faster and stronger? Can they be consumed in the form of whole foods or do we need special commercial supplements? At a 2014 meeting of Professionals in Nutrition for Exercise and Sport (PINESNutrition.org), exercise researchers from around the globe discussed that topic and provided answers to these and other thought-provoking questions.

Is there any difference between consuming pre-exercise caffeine in the form of pills, gels or coffee?

Regardless of the source, caffeine is a popular way to enhance athletic performance. Take note: High doses of caffeine (2.5 to 4 mg/lb body weight; 6 to 9 mg/kg) are no better than the amount runners typically consume (1.5 mg/lb; 3 mg/kg). Hence, drinking an extra cup of coffee is unlikely to be advantageous, particularly when consumed later in the day before an afternoon workout when it could end up interfering with sleep.

Do Montmorency cherries offer any benefits to sports performance? If so, what's the best way to consume them?

Tart cherries (and many other deeply colored fruits and veggies) are rich in health-protective antioxidants and polyphenols. Tart cherries can reduce inflammation, enhance post-exercise recovery, repair muscles, reduce muscle soreness and improve sleep. Runners who are training hard, doing double workouts or traveling through time zones would be wise to enjoy generous portions. Yet, to get the recommended dose of cherries that researchers use to elicit benefits, *you would need to eat 90 to 110 cherries twice a day for seven days pre-event*. Most runners prefer to swig a shot of cherry juice concentrate instead!

What about food polyphenols such as quercetin and resveratrol?

Polyphenols are colorful plant compounds that are linked with good health when they are consumed in whole foods. Yet, *polyphenol supplements, such as quercetin or resveratrol, do not offer the same positive anti-oxidant or anti-inflammatory benefits.* An explanation might be that once in the colon, where most polyphenols go, parts leak into the bloodstream during heavy exercise. These smaller compounds create the anti-inflammatory effect. Athletes who routinely eat colorful fruits during endurance training offer their gut the opportunity to distribute good health!

Does curcumin reduce chronic inflammation?

Curcumin (an active constituent of tumeric, the spice that gives the yellow color to curry and mustard) has beneficial properties that have been shown to help prevent cancer, enhance eye health and reduce inflammation. Subjects with osteoarthritis who took curcumin supplements for eight months reported less pain (due to less inflammation) and better quality of life. *Unfortunately, curcumin is rapidly metabolized and therefore has low bioavailability when consumed in the diet.* To increase absorption, supplements often contain curcumin combined with piperine (black pepper extract).

Does green tea help improve body composition in athletes? What is the best way to take it?

Green tea reportedly enhances fat oxidation and helps with weight loss, particularly when combined with caffeine. But the amount of additional fat burned is minimal, and the 10 to 12 cups of green tea needed to create any effect is a bit overwhelming. Hence, most studies use a green tea extract. Because green tea has not been studied in lean runners, we can only guess that *it is unlikely to offer a significant improvement in body composition.*

Is watermelon juice a powerful stimulant for sports performance?

Watermelon juice is a source of L-citrulline, an amino acid that contributes to production of nitric oxide. Nitric oxide helps relax the blood vessels and thus enhances blood flow so more oxygen can get transported to the working muscles. One study with athletes who consumed L-citrulline supplements reports they attained a 7% higher peak power output as compared to when they exercised without L-citrulline.

Yet, when athletes were given watermelon juice (contains L-citrulline) or apple juice (that has no L-citrulline), the peak power was only slightly higher and the L-citrulline gave no significant benefits. Watermelon is a nourishing fruit and a welcome refreshment for thirsty athletes. *You would need to eat a lot of watermelon to get the equivalent of L-citrulline found in (expensive) supplements.* Your best bet is to enjoy watermelon in standard portions as a tasty addition to your sports diet.

What can be done with pea, hemp or other plant protein to make them as effective as whey for building muscle?

In general, plants (such as peas, hemp) contain less leucine than found in animal proteins. Leucine helps drive the muscle's ability to make new protein. To increase the muscle-building properties of plant proteins, *you need to either eat large portions of hemp or pea protein to get a bigger dose of leucine, or you can combine those plant foods with leucine-rich proteins, such as soy, egg or whey.*

Your best bet to optimize performance is to optimize your total sports diet. No amount of any supplement will compensate for lousy eating.

Nancy Clark, MS, RD counsels both casual and competitive athletes. For information about her Sports Nutrition Guidebook (new 5th edition) see www.nancyclarkrd.com.

Cruise Season Concerns Over Outbreak

Before you head to the beautiful tropics for vacation this year, be aware of a recent report from the Centers for Disease Control and Prevention regarding transmissions in the Western Hemisphere of a little-known mosquito-borne virus called chikungunya.

The virus has now been identified in 17 countries or territories in the Caribbean and South America. The regions most affected are the Dominican Republic, Martinique, Guadeloupe, Haiti and St. Martin. From within the 17 jurisdictions, there were 4,400 laboratory-confirmed cases and 103,000 suspected cases as of late May—with the count almost doubling in the preceding two weeks.

So far, 28 cases have been reported in the U.S., and they are likely to increase. All but one were among travelers returning from affected areas, which ultimately means stateside transmission of the virus, which has no cure or vaccine, may also become an increasing concern. The virus cannot be spread directly from person to person, but if an infected person is bitten by a mosquito or mosquitoes, these “vectors” can easily transmit the virus to others.

Acute fever onset is a major symptom of chikungunya virus, as are chills, headache, sensitivity to light, rash, vomiting and severe joint pain. Treatment of the malaria-like virus includes rest, liquids and analgesics. The virus rarely leads to death; most patients see an improvement in symptoms in one week, though joint pain can last several months.

The best defense against the virus is to avoid mosquito bites. Chikungunya virus is a mosquito-borne alphavirus transmitted primarily by *Aedes aegypti* and *Aedes albopictus* mosquitoes, which also transmit dengue virus and are found throughout much of the Americas, including parts of the U.S. The CDC notes that, “Humans are the primary amplifying host for chikungunya virus.”

Though more than 95% of the cases have been reported from one of the five jurisdictions mentioned above, if you are traveling to the Caribbean or South America, use air conditioning or screens when indoors; outdoors use insect repellents or wear long sleeves and pants. The regions affected include Anguilla, Antigua and Barbuda, the British Virgin Islands, Dominica, the Dominican Republic, French Guiana, Guadeloupe, Guyana, Haiti, Martinique, Puerto Rico, Saint Barthelemy, Saint Kitts and Nevis, Saint Lucia, Saint Martin, Saint Vincent and the Grenadines, and Sint Maarten.

The World Health organization reports that chikungunya was first described in 1952 during an outbreak in the east African country of Tanzania. Since then it has been detected in about 40 countries across several continents.

Though hiking, snorkeling and various other outdoor activities, tours and specialty excursions are a big part of any island adventure, if you’re sole purpose is to get a little cardio in before hitting the buffet you may wish to workout indoors, where feasible. The hotel gym is a vector-free option, and many cruise ships have semi-enclosed running/walking tracks that will offer more protection than a trail run through the rainforest.

CDC Morbidity and Mortality Weekly Report, June 6, 2014, Vol. 63 No. 22, pp. 500-501,
<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6322a5.htm>

Nix the “Drinkable Sunscreen”

Certain diet, health, fitness and beauty aid manufacturers occasionally impress with the boldness—when combined with the sheer fraudulence—of their claims. The latest effrontery for profit is particularly alarming as we approach the dog days of summer. It’s a good idea to make sure young people, in particular, are made aware of the new pseudoscience since they may well be among the most exposed.

As reported online in the *WebMD Newsroom*, shortly before Memorial Day, Osmosis Skincare began aggressively promoting its *drinkable sunscreen*. The consumer is instructed to take two milliliters with two ounces of water for every four hours in the sun. The “UV Neutralizer Harmonized Water” supposedly uses “cellular vibrations” and “isolates the precise frequencies” needed to “neutralize” both UVA and UVB. The result is protection from the sun. The claims are beyond irresponsible; they are dangerous.

Recently released data show an alarming increase in skin cancer incidence: A study in the *Archives of Dermatology* revealed that more than two million people in the U.S. develop a total of over 3.5 million nonmelanoma skin cancers every year. This includes both basal and squamous cell carcinoma, the two most common types. The jump constitutes *a more than 300% increase in skin cancer* incidence since 1994, when rates were last estimated.

The makers of the new drinkable sunscreen say their product allows for *30 times* more sun exposure “than normal.” Its listed ingredients are distilled water and “multiple vibrational frequency blends.” WebMD reports that a 100-ml bottle of UV Neutralizer, either tan-enhancing or non-tan-enhancing, sells for \$30 online. They write that, “Other formulas of Osmosis harmonized water claim to aid vigor or joint health, and combat hangovers, among other purposes.”

Notwithstanding the company founder’s claim that the beverage contains frequencies that “cancel out UV radiation,” dermatologists declare it ridiculous. WebMD quotes David J. Leffell, MD, the David Paige Smith Professor of Dermatology & Surgery at Yale School of Medicine: “It’s scientific gibberish. Unless they are willing to present scientific, peer-reviewed data to support these claims, we have no choice but to dismiss it.”

Furthermore, ingesting something internally to provide a benefit that you can achieve by external means is usually a mistake. The American Academy of Dermatology felt the need to address the product’s claims directly, saying in a statement that the Academy, “wants to alert consumers that this drink should not be used as a replacement for sunscreen or sun-protective clothing. There is currently no scientific evidence that this ‘drinkable sunscreen’ product provides any protection from the sun’s damaging UV rays.”

Osmosis claims that, “If 2 mls are ingested an hour before sun exposure, the frequencies that have been imprinted on water will vibrate on your skin in such a way as to cancel approximately 97% of the UVA and UVB rays before they even hit your skin.”

This claim is followed by the forewarning that the water does not work for everyone, failing to provide protection for “less than 1% of the population.” They recommend users test its effectiveness first, and suggest those taking medication that increases sun sensitivity take extra precaution.

Sunscreen—typically an SPF of 30 applied every few hours—is the only form of sun protection that is recommended and regulated by the U.S. Food and Drug Administration. According to Osmosis, the FDA has not reviewed the product.

Osmosis Skincare, osmosisskincare.com

WebMD Newsroom, May 23, 2014, “Drink Your Sunscreen?” by Kathleen Doheny, <http://blogs.webmd.com/breaking-news/2014/05/drink-your-sunscreen.html>

Skincancer.org, 2014, Nonmelanoma Skin Cancer Incidence Jumps by Approximately 300 Percent

American Academy of Dermatology, Statement on Drinkable Sunscreen, May 22, 2014, <http://www.aad.org/stories-and-news/news-releases/american-academy-of-dermatology-statement-on-drinkable-sunscreen>

Wearable Biometric Collectors: Coming Soon?

In today’s health care philosophy—ideally, at least—prevention rules the day. Doctors and patients are increasingly aware that proactive strategies, most often involving diet and exercise, are fundamental cornerstones of a healthy life and implementing them practically often becomes the focus. Although reacting to symptoms and treating existing disease remains critical, we also look to monitor and preempt wherever possible. Now tied to this broader attention to prevention are new ideas and developments in the tech industry that could soon deliver wearable devices that collect biometric data on people, monitoring and reporting back blood pressure data, glucose levels and beyond.

Another way of putting it is: If recent developments in Silicon Valley are any indication, you may soon be hearing terms like “wireless health care,” “body computing” and “health-oriented wearables” a lot more often.

More Data, Readily Shared—But Accuracy is Key

The exchange of patient data between doctors and patients is an area that can benefit from additional strategies, and companies like Google, Apple and Samsung are exploring how to incorporate health IT features into wearable devices. Patients may soon provide information to doctors through devices such as smart watches that can measure and transmit biometric data. Health IT wearables will open a digital conduit so that, for instance, doctors can more readily monitor patients with chronic conditions while also cutting down on the need for office visits.

The first generation of wearable devices from companies like Fitbit and Jawbone collect information that people find interesting, like the number of steps walked, but have somewhat limited use from a health perspective. These devices and the technology they use were never validated for accuracy and the metrics they measure are not scientifically proven to have wellness benefits.

For wearable devices to be accepted by physicians, they need to be designed with absolute precision, the kind expected of their clinical counterparts. If this happens, physicians would likely welcome a new generation of scientifically valid wearables, since the high volume of data generated by such devices

may lead to new ways of identifying disease symptoms, measuring wellness and discovering nontraditional vital signs.

Most people spend their time outside of hospitals and wearable devices will give doctors data on how lifestyle affects a person's health. Given the huge installed base that the leading tech companies have, even limited use of wearables among their users could create useful data sets. You don't need much adoption or much continuous use to create a database that doesn't exist for medicine anywhere. For example, if you have the largest database of 18-year-olds' heart rates and blood sugar and activity, you've got a very powerful data set.

Wireless health is one solution to the challenges of providing health care for all in that it puts the patient at the center of the health care discussion. Tech companies are uniquely positioned right now to create continuous engagement with their users. Medical companies do not have that reach.

In Development

PC World reports that Apple executives met with the U.S. Food and Drug Administration in December to discuss mobile medical applications. The company is rumored to be developing a smart watch with health IT functions and has hired staff with backgrounds in medical sensor technology. The FDA's 2013 calendar noted that Google met with agency representatives as well, and Google developed and is testing a prototype contact lens that can help diabetics monitor their blood sugar by measuring glucose levels in tears.

Samsung and the University of California, San Francisco, recently established a lab on the school's campus called the Center for Digital Health Innovation to test and validate medical sensors and digital health technologies.

What Will Attract the Public?

To get people interested in using health-oriented wearables, the devices need to offer data that users can learn from, and to do that the data these devices would collect could be integrated with features from other applications so that, for example, a user could get content on what foods to eat to increase blood sugar if it got too low. Ultimately, people want well-designed, reliable consumer products that fit into their lifestyles. The major tech companies have an opportunity to make a big impact on medicine, because if wearable health devices take off, health care really will not function the same way. We'll see not only more sophisticated preventative care, but more remote care as well. Patient-monitoring outside the hospital is an exciting idea, since after all that is where we spend most of our lives.

Adapted from PC World, "Wearable devices with health IT functions poised to disrupt medicine," by Fred O'Connor, May 1, 2014, <http://www.pcworld.com/article/2150680/wearable-devices-with-health-it-functions-poised-to-disrupt-medicine.html>

USC Center for Body Computing, 2013, <http://bodycomputing.squarespace.com/>

Brain Cancer Risk and Smartphones

Smartphones are with us 24/7 now, even helping collect data while we sleep, as we explored in the last issue. So it is welcome news that decades-old, quite persistent concerns over cell phone use and brain cancer risk are, according to the most recent data, still unfounded.

An unpublished joint effort by British government officials and the telecommunications industry to correlate cell phone use with brain cancer risk has failed to turn up a link. The £13.6 million Mobile Telecommunications and Health Research (MTHR) research program was the U.K.'s largest to look at the possible health risks associated with mobile phone technology.

Cell phones emit radio frequency (RF) energy, and the concern over their use may have emerged from this fact because this type of non-ionizing electromagnetic radiation can be absorbed by human tissue. We hold our phones to our heads several times per day, so it was never an unreasonable concern—particularly in the early days of cell phones when little was known about long-term use.

Fast forward 11 years, and the data seems to strongly reflect that the phones are safe. Earlier this year, the chairperson of the MTHR stated, "This independent program is now complete, and despite exhaustive research, we have found no evidence of risks to health from the radio waves produced by mobile phones or their base stations."

The other type of electromagnetic radiation is known as ionizing radiation. This type includes x-rays, radon and cosmic rays. Exposure to [ionizing radiation](#), for example during [radiation therapy](#), is known to increase the risk of cancer. However, although many studies have examined the potential health effects of non-ionizing radiation from radar, microwave ovens and other sources, there is currently no consistent evidence that non-ionizing radiation increases cancer risk.

The only known biological effect of RF energy is heating. The ability of microwave ovens to heat food is one example of this effect. RF exposure from cell phone use does in fact cause heating, but it isn't sufficient to measurably increase body temperature. Perhaps more alarmingly, a recent study showed that when people used a cell phone for 50 minutes, brain tissues on the same side of the head as the phone's antenna metabolized more glucose than did tissues on the opposite side of the brain. The researchers noted that the results were preliminary, and possible health outcomes from this increase in glucose metabolism are still unknown.

It is generally accepted that damage to DNA is necessary for cancer to develop. However, RF energy, unlike ionizing radiation, does not cause DNA damage in cells, and it has not been found to cause cancer in animals or to enhance the cancer-causing effects of known chemical carcinogens in animals. Brain cancer incidence and mortality rates have changed little in the past decade. The National Cancer Institute writes that in the U.S., 23,130 new diagnoses and 14,080 deaths from brain cancer were estimated for 2013. The five-year relative survival for brain cancers diagnosed from 2003 through 2009 was 35%. This number is arrived at by comparing the cancer patient with the survival of a person of the same age and sex who does not have cancer.

The NCI notes, "The risk of developing brain cancer increases with age. From 2006 through 2010, there were fewer than five brain cancer cases for every 100,000 people in the U.S. under age 65, compared with approximately 19 cases for every 100,000 people ages 65 or older."

In theory, children have the potential for greater risk than adults for developing brain cancer from cell phones. Their nervous systems are still developing, and so more vulnerable to factors that may cause cancer. They also have smaller heads than adults and therefore greater proportional exposure to the phone's field of RF radiation.

So far, the data from studies in children with cancer do not support an increased-risk theory. The first published analysis came from a large case-control study in Denmark, Sweden, Norway and Switzerland. The study included children who were diagnosed with brain tumors between 2004 and 2008, when their ages ranged from seven to 19. Researchers did not find an association between cell phone use and brain tumor risk in this group of children. However, they did not rule out the possibility of a slight increase in brain cancer risk—data gathered through prospective studies rather than participant surveys will be key in clarifying whether there is an increased risk.

According to the NCI, an earlier case-control study in the U.S. was unable to demonstrate a relationship between cell phone use and glioma or meningioma. The amount of radio frequency energy a cell phone user is exposed to depends on the technology of the phone, the distance between the phone's antenna and the user, the extent and type of use, and the user's distance from cell phone towers. Another study published in 2010 in *BMJ* found no link between living proximity to base stations and perinatal leukemia risk.

NCI Fact Sheet, 2013, <http://www.cancer.gov/cancertopics/factsheet/Risk/cellphones>

BMJ, 2010, 340 doi: <http://dx.doi.org/10.1136/bmj.c3077>

THE CLINIC

Unraveling SI Joint and Hamstring Trouble

I am 35 years old, weigh 128 lbs, and am 5'5" tall. I started running in November 2012, but really started running consistently in the spring of 2013. At that time, I was running three times a week and never more than four miles at a time. Prior to taking up running, I did one-hour aerobic classes and spinning regularly three to four times per week.

I pulled my hamstring when I tried out a CrossFit class but continued running for over a month before seeking help because I thought the pain would go away. Physical therapy focused on strengthening and stretching, and reintroducing me back to running. When I started running again, I reinjured my hamstring and it was then determined that I also have a left anterior pelvic tilt. PT then also focused on hip, core and glute exercises.

I fell during PT and had significant pain for a few days in my left glute which hindered me from doing lunges for about a week. I also had pain in my left hip and left SI joint. I have tried stretches for my SI joint and took a break from running for over three months. I began doing spinning classes again pain-free, but it's hard to tell at this point what is causing what pain.

Heat helps my SI joint pain. Laying on my left side seems to aggravate it, as well as sitting sometimes. I have no pain in my back or hamstring while running, but all tingling sensations and pain occur afterward and stay with me. I also now experience this randomly sometimes. The pain and tingling comes and goes, but after running seems to linger longer.

Janice Bellifiore
Eastchester, NY

The pelvis is a tough area when injuries occur. The SI joints connect the lower back (sacrum) and pelvis posteriorly. In the front, the pelvic bones meet in the pubic region (symphysis pubis). The sockets of the hip joints are part of the pelvis. Numerous muscles attach to the pelvis—trunk muscles and muscles that originate on the pelvis and act on the legs and the gluteal muscles.

When you strained your hamstrings but continued running, you most likely altered your running gait; this will often cause you to shorten your stride on the affected side, which can impact other muscles and joints in the pelvis. The fact that you re-injured your hamstrings when you returned to running leads me to question whether there was a persistent strength deficit and/or gait abnormality. The pelvic tilt suggests muscle imbalance. The PT focused on the appropriate muscle groups.

The fall threw a major monkey wrench into your recovery. Not knowing how you fell and landed, it's impossible to say exactly what was injured in the fall. Your SI joints certainly could be inflamed due to the hamstring injury; a fall could aggravate this issue. It is also possible that there is an occult fracture of the sacrum or pelvis that is causing your pain. The tingling that you are experiencing is most likely due to irritation of the sciatic nerve as it passes through the buttocks. Activities and sitting will irritate the nerve, causing symptoms you describe in the leg.

At this point, you need a thorough evaluation of your back and hips. Further evaluation with x-rays and possibly an MRI or ultrasound may be indicated. Alignment, strength and flexibility must be assessed and deficits corrected. Treatment may include rehabilitation exercises, manipulation and possible treatment injections. Any injuries to the pelvic joints and muscles can be difficult to treat, with a slow recovery. Once you have recovered from this problem, a gait analysis may help correct any biomechanical issues that may be impacting your running.

Be patient. Hopefully the physician can identify the issue(s) causing your symptoms and an appropriate treatment plan can be initiated. Good luck!

Cathy Fieseler, MD
Tyler, TX

Tibia Stress That Just Won't Heal

I'm a 40-year-old female with a six-year competitive racing history, plus bike races and triathlons. I weight train weekly as well. Within three years, I have had four stress fractures in the right tibia. I've been to an orthopedic surgeon, a podiatrist, a physical therapist, a sports medicine doctor and two chiropractors. I have tried the following solutions: I run on a rubberized track once a week; I run on a treadmill once a week; I run on trails once a week; I take Fosomax, isoflavones and hydro-calcium supplements; I have had orthotics; I wear arch supports; after no impact exercise for six weeks, I had

pain immediately while trying to run on grass. Two bone scans revealed some bone thinning, but in my back only. I weigh 110 pounds. I'm running out of ideas.

Karen West
Fort Lee, NJ

If you are a highly competitive athlete with the kind of heavy training schedule you indicate, I would ask if you have irregular menstrual cycles, and whether this has been evaluated. Menstrual irregularity affects progesterone/estrogen cycles, which can have a significant and direct impact on your bone mass. You might want to see an endocrinologist for a work up. I am a board-certified orthopedic surgeon with a sub-specialty in foot and ankle. I have also been running for about 35 years. My experience has been that when you run into this problem there is something else going on that may be endocrine related. You are doing everything right: seeing a number of physicians, trying to crosstrain and running on easier surfaces. You have already addressed the biomechanical possibilities with orthotics, arch supports and altered training. Your underlying problem may be metabolic.

Raymond F. Lower, DO
Leesburg, VA

I also feel you may have a metabolic bone abnormality. I had another patient like this who ended up having an endocrine problem that is being treated successfully. I suggest seeing an endocrinologist interested in metabolic bone diseases. You may need one of several metabolic tests to see how your body is processing bone matrix information. Also, you will need a pituitary and thyroid work up. Usually, a university center near you will have this type of work up. There is an old adage in medicine, "Diagnosis precedes treatment." I'm not sure you've had a complete diagnosis yet.

Robert C. Erickson, MD
Canton, OH

Pain After Only 10 Minutes of Walking

I'm a runner who had been using weights three days a week to strengthen my chest, back, shoulders and arms until three months ago, when I started experiencing sciatica-like symptoms down my left leg, with no direct pain in the back. The pain was severe enough to cease both my running and my weight training. I began to make good progress with regular back stretching exercises, acupuncture, muscle relaxants, anti-inflammatories and chiropractic adjustments. I see a sports medicine doctor who oversees these treatments. I am a 160-pound, 58-year-old male who usually averages 15 miles a week at 9 or 10 minute pace.

I had reduced my pain considerably in the mornings, with no pain for the rest of the day. I gradually started walking, then walking and running, then running for three miles. I was down to just the anti-inflammatory drug and regular stretching when I had a major setback a month ago, while I was out of town. I was unable to even stand from the terrible pain down my leg. I ran the day before this occurred without any problem. I am back on acupuncture, avoiding the chiropractic, and making progress, though the numbness on the bottom of my left foot continues. I am only taking an anti-inflammatory. I walk as much as I can, which is only for about 10 minutes. How should I go about starting my weight training and running once the nerve heals?

Kevin Spencer
Irvine, CA

I think your spine is a likely source for your symptoms. Even without back pain, sciatica usually arises from the spinal nerve roots. Some practitioners diagnose piriformis syndrome as a sciatica source when back pain is absent. This is a deep muscle in the buttock that lies over or around the sciatic nerve. The notion is that the nerve gets compressed by this muscle when it is tight, spasmed or externally compressed, such as by a wallet. These scenarios are medically possible, but in reality probably very rare. The problem, if it is truly nerve related, is almost always the spine.

A combination of degenerative disc bulging and bony joint enlargement compresses an existing spinal nerve root, usually the lowest lumbar or the first sacral nerve. The majority of sciatica resolves. But your case is unique in that you are 58, you want to get back to running and you may not be getting better. I recommend an MRI study of your lumbar spine; recommendations for activity will be in part based on the results. This can also help the chiropractor determine how best to apply his/her skills.

The initial rehab sounds like it was appropriate. You will have to start from scratch again. When symptoms return like this, you need to see your doctor and work up the problem for a more definitive diagnosis. Generally speaking, return-to-running programs involve starting at a pain-free level and only increasing mileage by 10 percent per week.

Rob Scott, MD
San Diego, CA

Don't Shirk Stretching for a Fractured Calf

I broke my fibula three months ago, and was wondering what I may need to know as I slowly return to running. I am 60 years old and have been running for about two decades.

Gordy Scoseria
Mt. Desert Island, ME

After a trauma such as a break, the time you spend immobilized helps the bone heal, but weakens the ligaments and tendons. The break may be fully healed but it will take some time for the tendons and ligaments to regain their elasticity and strength. I'm assuming your injury has fully healed and your doctor has advised you to begin exercising again.

To increase both range of motion and lateral stability of your ankle, trace the alphabet in the air with your foot. Try both upper case and lower case letters. After several weeks, gradually work the turns back into your workouts.

Establish pain-free walking, before adding running intervals. Gradually increase the time spent running and decrease the walk breaks. Once you are able to run continuously, begin your progression gradually by choosing to increase the intensity

or volume of your workouts, not both. Also, do 95% of your training on a smooth, level surface (like a track or a treadmill), running only on the straightaways. Lateral stability is the last to recover, so taking the turns should wait.

Give ample attention to stretching, especially the lower legs. Tightness in those muscles and tendons can put added stress on the bone. Always include rest and recovery between workouts to avoid overuse injury as you return to your previous level of running. Make use of crosstraining modalities like cycling and swimming to help strengthen muscles without leading to re-injury or new overuse injuries. Deep water workouts can also help you maintain fitness and strength without impact.

Greg Tymon, MS
East Stroudsburg, PA

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BE A MILER! NATIONAL RUN A MILE DAYS 2014 gains more miles

R U A Miler and BE A MILER ask similar questions. Young boys and girls took to the fields and tracks to run a mile and let it be known, they were “Milers”. Close to 20,000 students in elementary and middle schools from New Hampshire to Virginia to North Carolina to Washington to California hosted MILE DAYS Events in the May 2nd thru 12th timeframe.

RUNNING THE MILE is the Campaign. The Call to run or participate has either asked or demanded that you “are” or “be” a miler. Whether a boy or girl knows it or not, we consider everyone a miler. How fast you cover that mile defines your preparation, motivation and fitness. The American Running Association just wants one thing: answer the call and do your best to run the mile and start a fitness regimen. That first mile can lead to a love of running and ultimately a healthier person.

Once a principal or lead PE teacher committed to the MILE DAYS event, classrooms and hallways in elementary and middle schools began the process of training their students. “BE A MILER” posters arrived and training plans were initiated during the winter and spring weeks leading up to the annual NATIONAL RUN A MILE DAYS in May. Since American Running began this grass roots program in 2007, schools and clubs across the country have taken the challenge

to kick-start spring running programs. The call to “*Be A Miler*” or the question “*Are You A Miler*” was answered with a resounding “Yes!” at more schools and clubs in 2014.

The 2014 “RUN A MILE DAYS TOUR” hit the road starting in Northern Virginia with Mark Twain Middle School in Alexandria VA. ARA was fortunate to have several VIPs act as our Ambassadors at several stops during the 11 days of the 2014 MILE DAYS Tour. ARA’s Executive Director covered the East Coast and more specifically the Mid-Atlantic states plus Virginia. Dave’s first stop was the middle school in Alexandria, VA. Mark Twain Middle School has just over 900 7th and 8th graders. It is an ethnically diverse school with youth from over 30 countries. Each PE class ran a mile course that utilized a lap on the school’s crushed gravel track and an extended loop of the schools’ fields. Every mile finisher collected his or her Miler Certificate and “*BE A MILER*” tee.

The Midwest MILE DAYS’ Tour started in earnest with American Running’s Ambassador 3 time Olympian Craig Virgin. Craig is a legend in Illinois dating back to his record-setting high school days out of Lebanon IL. As ARA’s MILER Ambassador, Craig visited 4 schools over a 4 day period. He gave a rousing presentation at Shariel Espinoza’s Goodwin School in Cicero. He concluded his Illinois Miler Tour in the suburban Chicago area. All told, Craig Virgin assisted over 2000 students who hit the track or trail to run a mile. His takeaway: that kids today just need the opportunity to run and the encouragement of educators who believe in fitness for all shapes and sizes of students.

Our West Coast MILER DAYS Tours were highlighted by events in the state of Washington and California, not to mention Oregon. ARA was represented at our top SoCal Tour stop in Anaheim by Dexter Emoto. Dexter is a recovery room nurse and prolific marathon runner. He also is an accomplished photographer and visited Gauer Elementary in Anaheim as our California Ambassador the Mile. Gauer Elementary is a school comprised of over 85% Hispanic, Latino and other ethnically diverse students. Through the efforts of their fitness-crazed principal Debbie Schroeder, the call to run a mile is not taken lightly. When Dexter visited, he was met by an enthusiastic and motivated group of children. Running the Mile was both a challenge and an enriching experience.

The Pacific Northwest is no stranger to running. Eugene Oregon has reinforced itself as the Mecca of track and field with legendary Hayward Field host to many National and international track events. The trails and tracks in neighboring Washington have just a storied background in running. Perhaps the influence of running community has led to the Peninsula School District and Greater Gig Harbor – Tacoma area being our largest single hosted “RUN A MILE DAYS” event. Our host and champion is Dr Pat Hogan. We have touted his salesmanship of the RUN A MILE DAYS concept in previous years. Dr Pat has not stopped. For 2014, we added several more schools and now estimated the number of Mile Finishers during the May 2 – 12 period to be over 15,000 students. Pat would tell you that he is not the key but merely the guy who has infected the area with enthusiasm for the MILE in schools. His key person continues to be PE teacher Dave Rucci. Together, the two have convinced other schools to jump aboard. New to the event this year was a high school. In addition, neighboring school districts have joined the

MILE DAYS and have gotten their communities to volunteer at the Mile events. Hedden Elementary in Edgewood Washington is one of those communities who worked with Pat Hogan to grow and prosper. This year, they brought in Ed Lyчек, a hip leg amputee above the hip who won this year's mobility impaired division of the Boston Marathon. Ed was all the motivation needed to get kids to run a mile on a drizzly day.

The MILE DAYS Tour wrapped up with some Mile events in new locales including New Hampshire and Alaska. The Alaska Mile Day s event took place in Skagway. ARA sent tees and certificates to the remote town making their community the furthest and most remote US "MILE DAYS" participant.

If you or your community is interested in hosting MILE DAYS events in 2015, please email Maria Kolanowski, [maria@americanrunning.org] and include your name, school or club, email address and daytime phone number. We are expanding the MILE DAYS timeframe to cover the first 2 weeks in May 2015.

High School Coaching Update: PENN RELAYS and National Outdoor Championships

Magical run continued for our distance girls quartet in the Distance Medley Relay (DMR)

Several years from now, we will start to truly appreciate and marvel at the relay success our group of 5 girls (4 ran in each relay race) had over a 12 month timeframe. Starting in June 2013, the West Springfield HS (VA) girls Distance Medley Relay or "DMR" won a National Outdoor title, followed that up with an indoor title at Nationals in March 2014, won the prestigious Championship of America at the Penn Relays and then completed the relay championship run in June 2014 with a repeat Outdoor DMR title. Five girls have made up all 4 championship relays. The only leg of the relay that has fluctuated has been the 400m runner. The Opening 1200m, the 3rd leg at 800m and the anchor leg of 1600m were run by the same 3 girls. What made it possible besides hard work and commitment to the concept of racing a relay was our leader and nationally ranked distance runner Caroline Alcorta. The anchor in the DMR is the key leg. It can also be argued that the opening 1200 leg must position your team up front, so the 400m and 800m legs can either put you upfront or within striking position of the lead. The most impressive of the wins was the PENN RELAYS Championship DMR. West Springfield took the baton on anchor leg in 7th place, some 90 meters behind the leader. Alcorta kept her cool yet aggressively moved through the field to pull even on the leader at the 800m mark. She ended up running a 4:46 anchor split and won by 60m. The final meet in the girls DMR string of titles was at the recently completed New Balance Outdoor Nationals. The other top contending team's anchor had beaten Caroline Alcorta at Footlocker Cross Country Nationals and in another national 2 mile race. At the Outdoor Nationals DMR Final, Alcorta took the baton even with Staples (CT) team and their anchor Hannah DiBalsi. The two girls ran shoulder-to-shoulder for 800m. On the 3rd of 4 laps, Alcorta started to pull away and grabbed a

20m lead with one lap remaining. She held on with an even –split 4:48 anchor leg in the 90 degree heat of Greensboro NC. As an assistant coach, I was just along for the ride. The head coach had the master plan and I focused on the mental game of confidence and focus. Teamwork prevailed where many teams get sidetracked by individuals' own pursuits of medals and national rankings. Hoisting that PENN RELAYS "WHEEL" is something 4 girls and coaches will never forget.

Seen and Heard while Running

Strength Training in high school girls' distance runners. Maybe it took the success of 3 high school aged girls, one of whom turned "Pro" in the fall of her senior year of high school. Mary Cain is an immense talent in the middle distance. She is neither tiny nor thin. Her coach is the former World record holder in the marathon and Olympian Alberto Salazar. He is quite vocal about strength training, nutrition and periodicity in training in men and women. He first gained attention with the training and coaching of his protégé Galen Rupp. Coaching young high school-aged girls was not part of Salazar's regime. He did coach Kara Goucher to success at the marathon distance, but not a high school girl. Cain has filled that void and also changed the image that young girls who aspire to be a fast runner. Strength and power are the new thin and skinny. For years, I witnessed podiums at regional, state and national level meets filled with ultra-thin young girls and women. As a Dad of a high school and now D1 collegiate distance runner, I cringed at the message being sent to coaches and athletes. Privately, many parents and coaches whispered about how long it would take for that young runner to break; i.e., become injured by a stress fracture or worse. We have all heard the heart-breaking stories of young talented women who keep striving to regain the speed they had as freshman or sophomores in high school, all before puberty and body changes occurred. They would fight the natural weight gain and cut back on a balanced diet. Most of these young women could not win this race of speed vs. body weight.

That is why it is encouraging to see coaches and athletes embracing strength training and proper nutrition. The focus on a 40-30-30 diet (Carbs, fats and protein) and avoidance of sugars complements the strength training regimen. Girls are lifting weights, doing "Guy" Pushups, pull-ups and not shying away from any strength-gaining exercise.

Mary Cain is a role model in many ways she might not comprehend. Her upbeat personality goes hand-in-hand with her powerful running style. It is OK to be a bigger girl and be powerful. It's also healthier.

Run Early in the Day, avoid the heat and enjoy Summer!

The American Running Association Staff