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Injury Prevention

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Heat Illness

As the temperature rises, the risk of heat illness increases. During exercise, a significant amount of heat is generated. In cool weather, this generated heat is transferred to the air. In hot weather, this transfer of heat is inhibited, causing the body temperature to rise. Sweating occurs to help regulate body temperature; the evaporation of sweat from the skin results in dissipation of heat. As the humidity rises, there is a decreased rate of evaporation of sweat, diminishing the cooling effect.

Exercising in the heat places a great stress on the body. Performance is decreased; heart rate is increased compared to the same level of activity at a cooler temperature. The risks of dehydration and heat illness increase as the temperature and humidity increase.

Acclimatization

The body will adapt to repeated episodes of exercise in the heat to reduce the impact of heat on performance and the risk of heat illness (the risk of dehydration is not reduced). The amount of fluid circulating in the body is increased to meet the demands of the muscles and skin. Sweating will occur earlier in the course of exercise and at a lower core temperature. The rate of sweat production is increased and the sodium content of the sweat is decreased. These adaptations will occur over a 7 to 15 day period and will persist for up to 3 weeks after leaving a hot environment.

Risk Factors for Heat Illness

No one is immune from the risk of heat illness, but the risk is greater in those who are out of shape, overweight, dehydrated, ill, taking certain medications or supplements, or are not acclimatized to the heat. Wearing excessive clothing (i.e. tights) or a helmet and padding decreases the body's ability to dissipate heat resulting in an increase in core temperature.

Dehydration

Heat illness from exertion is a spectrum of disorders ranging from heat cramps to heat stroke. Dehydration is a major factor in each of these disorders; even a minor degree of dehydration negatively impacts athletic

performance and the body's ability to dissipate heat. Symptoms of dehydration may include thirst, irritability, dizziness, nausea, vomiting, cramps, chills, weakness and fatigue. Checking weight prior to and following exercise provides guidelines for assessing the degree of dehydration; each pound that was lost represents a 16 ounce fluid deficit that needs to be replaced.

Heat Cramps

The exact cause of muscle cramps is not truly known, but cramping tends to occur later in activity, in association with fatigue and dehydration. Athletes who lose a lot of salt in their sweat (white crust on clothing and skin) often experience muscle cramps.

Gentle stretching and massage may help reduce pain from cramping. Lost fluids and salt must be replaced in the diet.

Heat Exhaustion

As a result of strenuous activity in the heat, the body may not be able to deal with the increasing demands on the cardiac and circulatory systems, causing heat exhaustion. Symptoms may include severe fatigue, dizziness, fainting, chills or goose bumps, dehydration, headache, nausea, vomiting, diarrhea and stomach or muscle cramps. The core (rectal) temperature is elevated, but typically less than 104^{o} F.

The athlete should be removed from the heat and cooled off. Lay him/her with the legs elevated. Ice packs on the groin, armpits and neck may be used for cooling. Have the athlete drink cool water or sports drink. If disorientation develops, vomiting prevents rehydration or any symptoms worsen, the athlete should be transported to the emergency room.

The athlete should be evaluated by a physician prior to return to play following an episode of heat exhaustion. A gradual return to full activity and intensity is recommended.

Heat Stroke

Heat stroke due to exertion is the result of the breakdown of the thermoregulatory system; this causes severe stress on the circulatory, metabolic and nervous systems. The body temperature rises to extreme levels, causing cell and tissue damage and could result in death.

This is a medical emergency. The core (rectal) temperature is usually greater than 104^{o}F; temperatures taken in the ear, armpit or orally do not adequately reflect the body temperature. The athlete has mental status changes; he/she may be unconscious, irritable, convulsing, confused or disoriented. Typically the athlete **is** sweating in the case of exertional heat stroke.

Any of the symptoms listed for heat exhaustion may also be present.

The most important part of treatment is to start cooling the athlete immediately as 911 is called. Place ice on the neck, groin and armpits, spray with cold water or immerse in a tub of cold water. Monitor the

breathing, pulse and temperature closely. Stop the cooling when the core temperature reaches 101^{o} F. The athlete should be transported to the emergency room.

Prevention

The risk of heat illness can be decreased by slowly increasing activities in the hot weather. Start exercising a few weeks before training camp begins. Frequent rest and water breaks are important. Checking your weight prior to and following exercise allows rehydration prior to the next practice. Add salt to your food while exercising in the heat. Limit exercise if you are sick. Stay away from supplements containing stimulants. The risk of heat illness is increased by: medications such as certain antidepressants, anticholinergics, antihistamines, diuretics, and beta blockers; use of alcohol and many abused drugs; sleep deprivation; certain chronic medical conditions and obesity. Children and the elderly are at increased risk of heat illness.

Be smart and stay safe. Don't tough it out if you start to feel ill; early treatment of heat illness will prevent a potentially fatal outcome.

Running Injuries

The sports page is constantly filled with articles about injured football and basketball players, but did you know that at least 70% of runners will sustain an injury related to their sport at some time? Luckily, the majority of these injuries are not severe and with appropriate treatment, the impact on training may be minimized.

As opposed to the torn ligaments and broken bones that occur in contact and collision sports, the majority of the injuries that affect runners are related to overuse. These injuries develop as a result of low grade forces applied repeatedly over a prolonged period of time. Common overuse injuries in runners include tendonitis and stress fractures.

A number of factors contribute to the development of overuse injuries, but far and away the worst culprits are training errors. Increasing mileage too quickly, rapidly increasing intensity of training, or a combination of both leads down the road to injury. Other factors that play a role in the development of overuse injuries include issues with anatomy, such as flat feet, poor running surface, such as concrete and inadequate running shoes. Addressing an injury early may prevent a more serious problem from developing.

It is important to pay attention to the early warning signs of an overuse injury – the mild soreness that develops while running or the swelling that develops following activities. Determine why this problem has developed – did you change your training? Do you need new shoes? If there is discomfort present at the beginning of your run cut back on the distance

and intensity of the workout. Use pain as your guide in determining your training while symptoms are present. Apply ice to the tender and/or swollen area for 15 minutes following workouts and 2 to 3 more times during the day. If your physician states that it is okay for you to take anti-inflammatory medications, such as ibuprofen, naproxen and aspirin, these can be helpful in alleviating discomfort. Make sure that you take these medications with food and as directed on the label.

You should seek consultation with a sports medicine physician if you have persistent pain despite decreased training, pain persists for more than 10-14 days, symptoms resolve with rest but recur when training is resumed or if you must take pain medications in order to run. Pain = no gain. Training will be suboptimal and you may subconsciously alter your gait to decrease pain, creating additional problems.

As expected, the vast majority of running injuries involve the lower extremities, with the knee being the most common problem area (40% of running injuries). Knee pain may be due to inflammation of the kneecap (patella) or the iliotibial (IT) band which courses along the outside of the knee. Other common running injuries include plantar fasciitis (inflammation of a band on the bottom of the foot), Achilles tendonitis, shin splints and stress fractures (tibia, fibula and foot bones are the most common sites).

Runner's knee causes pain under or around the kneecap; the pain begins gradually and is aggravated by squatting and on stairs (especially descending). There may be some stiffness in the knee following prolonged sitting, especially in a tight space, such as a movie theater. Tight hamstrings, muscle imbalances creating weakness in the quadriceps, and feet that roll in too much while running (overpronation) all contribute to this problem. In addition to the measures noted above, treatment includes avoidance of aggravating activities, such as squatting, work on stretching and strengthening the hip and leg muscles, and the correction of any foot/shoe abnormalities.

The Iliotibial band courses from the hip to the knee along the outside of the leg. Inflammation of the band causes pain along the outside of the knee that is aggravated by long runs, downhill running and overstriding. Predisposing factors for this problem include running on a banked surface, increased mileage and bowed legs. Stretching and strengthening the hip muscles are important along with the basic treatment regimen.

Plantar fasciitis is inflammation of a band that runs along the bottom of the foot from the heel to the ball. Common symptoms include pain when getting out of bed and when standing following prolonged sitting. Predisposing factors include arches that are too high or too low, inadequate footwear and training errors. When this problem is severe, runners may have to resort to non-weightbearing exercises, such as

cycling and pool running. In addition to the basic treatment of overuse injuries, work on stretching and strengthening the muscles of the foot and lower leg. Always wear shoes with good support, even when getting out of bed. Adding arch supports or heel cushions to your shoes can be helpful. For persistent pain, a night splint and possibly even a cortisone injection may be recommended.

The Achilles tendon attaches the calf muscles to the heel. This structure may become inflamed due to excessive hill running or stair climbing. Running shoes with an inadequate heel (such as racing flats) may aggravate the tendon. Beyond the basics, treatment includes use of a heel lift to take some tension off of the tendon. Hill training should be avoided until pain resolves. Stretching and strengthening of the lower leg muscles is an important component of the healing and prevention of this problem.

Shin splints is a term used to describe pain along the tibia (the large shin bone). This may occur at any age, but is more common in children and teenagers. Contributing factors for this problem include a sudden increase in training, shoes with insufficient shock absorption, toe running and running on hard or banked surfaces. Additional treatment includes appropriate footwear, stretching the calf muscles and strengthening the muscles in the front of the lower leg.

Stress fractures are microscopic fractures of bones secondary to repeated stress. In runners, this most commonly involves the tibia and the bones of the foot; stress fractures of the fibula, femur (thigh bone), hip and pelvis are also seen in runners. The most common cause of stress fractures is a sudden increase in training. Persistent pain in the thigh, shin or foot, despite rest, raises concern for this injury. It is important that a stress fracture is diagnosed early, as repeated stress on the injured bone may cause a full-blown break to occur. Active rest (non-impact activities) is the main treatment for a stress fracture.

Pay attention to pain. Your body will let you know when a problem is brewing; ignoring the warning can lead to a myriad of unwanted problems and an extended time away from running.

It's Hip to be Strong

Hip pain is a very common problem for runners. Occasionally, there is a specific injury that causes the pain. Slipping on a slick surface or stepping in a hole may traumatize the hip. Overuse injuries are a much more frequent source of hip pain in runners. In order to understand hip pain, a brief anatomy lesson is in order.

The hip moves in 3-paired directions - forward (flexion) and backward (extension), inward (adduction) and outward (abduction), and internal and external rotation (rolling the leg in and out). Specific muscles are

responsible for each of these movements. Certain muscles, such as the hamstrings and *rectus femoris* (one of the quadriceps) originate above the hip and attach below the knee. Because these muscles cross two joints, they are more susceptible to injury.

Injuries tend to occur due to underlying muscle imbalances. Tight hip muscles are especially common in distance runners. The shortened stride length of the distance runner does not allow the hip to move through its entire range of motion; this results in tighter, less flexible muscles. This does not surprise many runners. What does surprise them is the hip weakness that is commonly found on examination. Despite the fact that the hip flexors bring the leg forward with each stride, weakness is often present. Distance running does not incorporate much knee lift, so the hip flexors are not as strong as one would expect. Injuries often occur when sudden changes in the quantity or intensity of training overcome the ability of the muscles to move the hip through its normal motion. This abnormal stress produces pain and often causes altered running mechanics.

Common examples include out-toeing due to tight hip rotators (muscles in buttocks); running stride decreases in length as hamstrings become progressively tighter. Over time, these stresses cause inflammation, which produces pain, swelling and decreased function.

Hip pain may be due to musculoskeletal or medical conditions. Injuries to specific muscles and/or tendons are common in runners. This may involve the hip flexors, hamstrings (extensors) or adductors. Problems with any one of these muscle groups may cause a myriad of complaints. Tightness and inflammation of the hip flexors may cause a change in posture and result in low back pain. This can also cause the involved leg to function as if it is shorter than its counterpart, which plays havoc with running mechanics. Hamstring injuries may cause the runner to shorten his/her stride on the affected side, which results in rotation of the trunk. This may cause pain anywhere from the shoulders to the feet.

The hamstrings originate on the lower portion of the pelvis (the small bony prominence that you sit on). Irritation at this site causes a nagging pain anytime that the muscles are stretched. Sitting, especially in a car or on a hard chair may cause pain that radiates down the back of the leg. Irritation of the *piriformis*, one of the muscles in the buttocks, is another cause of pain in the back of the hip that may radiate down the leg.

The iliotibial band originates as a sheet of muscle on the side of the pelvis. As it passes over the side of the hip, it is protected from rubbing against the thigh bone (femur) by a lubricating sac called a bursa. Weakness, poor flexibility and running on a banked surface all predispose the runner to irritation of the bursa. This causes pain along the side of the hip, which is exacerbated by lying on the affected side, climbing stairs and crossing legs (affected leg on top).

A less common, but very important cause of hip pain is stress fractures. Repetitive stress may produce a microfracture in bone; continued stress may cause the bone to break. Stress fractures in the hip and pelvis often cause muscle pain; a strain is often diagnosed. Pain is often present with walking. Cessation of running for a few days does not help. It is very important to make this diagnosis quickly; continued impact activity, even just walking may cause the hip to fracture. This may require surgery and could jeopardize future running.

Lower back injuries may cause pain to radiate into the hip. A ruptured disk may cause groin pain or pain in the buttocks, especially with activity. Injuries to the sacroiliac joint (where the lower back meets the pelvic bones) are a difficult-to- treat cause of buttock and hip pain. Inflammation of the symphysis pubis (where the pelvic bones meet in the front) may cause hip pain.

Before blaming everything on the muscles and bones, don't forget some other causes of hip pain. A hernia is a protrusion of intestine into the groin, caused by a weakness in the surrounding tissues. Sometimes there is an obvious bulge; there may just be an ache that is aggravated by activities. This can usually be detected on physical exam. Yes, women can develop hernias.

Infections involving the urinary tract and reproductive organs may cause pain in the hip or groin. Clues include pain with urination, fever, and blood in the urine, but the problem may present with a nondescript pain in the groin. Kidney stones may also cause pain that radiates into the hip and groin. Testicular problems, ovarian cysts and other issues involving the reproductive organs may cause pain in the hip and groin and should be considered when the etiology of the pain is not readily apparent.

So what's the bottom line? Hip pain may be due to a variety of problems. The most common cause of pain in runners that present to my office is muscle imbalance. Poor flexibility and basic muscular weakness promote poor running mechanics. Over a prolonged period of time, inflammation develops, causing pain and decreased function. Continued activity in spite of these symptoms causes compensatory changes which impair biomechanics even further. By the time the runner presents for evaluation, the problem has often been present for months and everything hurts.

To avoid this, stretch regularly. Find ways to incorporate stretching into your busy work schedule (the person on the other end of the phone does not need to know that you are stretching while speaking with him). Do not neglect strength exercises; although a number of runners lift weights, many do not feel that they need to work on their legs; they must be strong from running, right? The weakness that I find on examination of many long distance runners is quite remarkable. Working on hip strength will improve

running and decrease the risk of hp pain. Whether you do simple leg raises (in each direction that the hip moves) or have access to a gym with a universal hip machine, find a way to incorporate this into your training routine. Add form drills to your workout; activities such as High Knees and Skip Bounding can work wonders for hip strength and flexibility.
If you develop hip pain that is persistent for more than a week or pain that is getting progressively worse, seek medical evaluation. You don't want to risk the potential consequences of a stress fracture or ignore a significant medical problem.

Piriformis Syndrome

You're 12 weeks into your marathon training program; while out on a long run, you develop a sharp pain in your buttocks. As you continue to run, the pain persists. Your hamstrings feel tight and even a little sore, though by slowing the pace the symptoms subside a little, and you finish the run. While sitting at your favorite post-run hangout, there is a tingling sensation in the back of your thigh and calf.

You've just been introduced to your piriformis muscle. This muscle arises from the sacrum, passes through the sciatic notch (an opening in the pelvic bone) and attaches to the bony prominence on the side of the thigh (greater trochanter). The piriformis plays a role in the outward rotation of the hip. The sciatic nerve is formed by five nerves exiting from the spinal cord; it typically passes through the notch in front of the piriformis. In approximately 15 percent of the population, the nerve passes through the muscle.

Problems occur when the piriformis becomes inflamed. This may be due to direct trauma (falling on your butt), overuse, or a sudden, forced rotation of the hip, which may occur when running on an uneven surface. The inflamed muscle may cause pain in the center of the buttock or may compress the sciatic nerve causing pain, aching or tingling in the leg. Pain may be increased by sitting, climbing stairs, or squatting. Deep palpation of the center of the buttocks will cause pain, as will sudden stretches of these muscles. Initially you can run through the pain, but in many cases, symptoms become severe enough to restrict activity. The muscle tightens and may even spasm during activities, which can cause an alteration in gait. The affected side of the pelvis is pulled upward, creating a functional leg length difference; stride on the affected side is shortened. These alterations in gait can cause a number of overuse injuries due to poor biomechanics.

Why Me?
Why did you develop this problem? A common finding is tight hip adductor muscles (these are the muscles along the inner aspect of the thigh that pull the leg inward), which override the hip abductors (muscles along the outside of the thigh that pull the leg outward); the piriformis acts as a hip abductor. If your foot excessively pronates when pushing off, your leg rotates inward; the piriformis acts as an external rotator of the hip (turns outward) and contracts

in reaction to each push-off.

Not all pain in the buttocks and legs is due to piriformis syndrome; diseases of the lumbar spine, such as a ruptured disc, and dysfunction of the sacroiliac joints are just a couple of the common causes of pain in this region. Stress fractures of the sacrum or pelvis can cause recalcitrant pain in this region.

If you are avoiding the doctor, you will need to work on stretching your piriformis muscle. One method of doing so is to lie on your back, bend the affected knee and hip (illustrated above). Grasp your knee with the right hand and push toward your left shoulder. Grasp your right ankle with your left hand and rotate the leg inward.

To stretch the hip adductor muscles, sit on the floor and put the soles of your feet together, holding your feet with your hands. Very gently pull yourself forward until you feel a stretch, not pain, in the groin muscles. Make sure to lean from the hips and lower back, not the upper back and neck. Hold this stretch for 20 to 30 seconds. Work on stretching all of the muscles of the hip, as they will have been affected by the alteration in gait.

Strengthening the hip abductors is very important. Lie on your side and lift the upper leg 25 to 30 inches, making sure that your pelvis remains perpendicular to the floor. Hold this position for 10 seconds. Perform 10 repetitions at the start and gradually increase the number over time. As you become stronger, you may wear an ankle weight while performing this exercise. You can work other major hip muscles in a similar manner, lying on your back for the flexors, on your abdomen for the extensors (upper hamstrings) and on your side with the upper (non-exercise) leg moved back for the adductors.

Depending on the severity of your symptoms, you may be able to continue running, but will need to decrease your mileage by at least 50 percent. Avoid speedwork; you should not run hills or on uneven terrain.

Getting Help
If you are working on stretching and strengthening, but running has become progressively more difficult, you should see a local sports medicine specialist. The evaluation should reveal a tender area in one buttock. Provocative stretches will cause pain, possibly even symptoms radiating into your leg. Evaluation of your lower back and hip will be normal; X-rays will be unremarkable. If nerve studies are performed (not usually ordered), they are typically normal; if your hip is manipulated during this test, abnormal results may be seen. Other tests, such as an MRI, may be used to help rule out other sources of your pain, but results usually are normal with piriformis syndrome.

Once the diagnosis is made, what next? Treatment may include a combination of physical therapy (exercises and modalities, such as

ultrasound), anti-inflammatory medications, deep tissue massage, and possibly a cortisone injection. You may need to stop running and perform cross training that does not cause pain. Once symptoms subside, continue the exercises as you gradually increase your training. Once you have re-established your base, you can slowly add hills or speed work.

If symptoms are not improving despite all of these measures, surgical release of the piriformis may be necessary; other muscles will take over the function of the piriformis. The majority of patients have pain relief following this surgery, but this treatment is a last resort.

Be smart with your training; maintain good strength and flexibility of your trunk and hip muscles to decrease the chances of an introduction to your piriformis.

Too Much of a Good Thing – Hyponatremia

As summer approaches, we are constantly reminded to drink lots of fluids, to prevent dehydration and heat illness. If some is good, is more better? For years you have heard that it is important to remain well hydrated, especially during exercise. Dehydration impairs the function of all body systems, putting the athlete at risk for problems ranging from poor performance to heat stroke and death. Water is a great fluid replacement drink…. to a point. It is possible to drink too much water and basically dilute the body's levels of electrolytes, especially sodium. This said, it is important to remember that dehydration is a much more common occurrence. Thirst is a poor indicator of hydration status; you may be 1-2% dehydrated before you experience thirst.

So, what are you supposed to drink? When you are not exercising, water is fine. During exercise lasting less than 60 minutes, water is a suitable drink. Longer workouts are where things get somewhat unpredictable. People sweat at different rates, ranging from a half quart up to 4 quarts of fluid lost per hour. Several factors determine rate of sweat. Some people have more sweat glands, so they produce more of this fluid. Heat and humidity greatly affect the rate at which sweat is produced. Level of fitness also plays a role; as the body adapts to exercise, especially in a warmer environment, the body produces greater quantities of sweat during exercise, as an adaptive response to the heat that is produced by exercise.

How do you figure out how much sweat you produce? Weigh yourself before and after exercise. Each pound that you have lost represents a fluid deficit of 16 ounces. If you exercised for 30 minutes and lost 1 pound, you can work on the premise that you lose about a quart (32 ounces) of fluid each hour. Plan on drinking an adequate amount of fluid during longer workouts to account for this. This is a rough guide, since the weather, especially humidity will affect the rate of sweat production on any given day, but it should put you in the right ballpark.

The concentration of sodium is also extremely variable. Often, as the body adapts to exercise in the heat, the body produces greater quantities of less concentrated sweat. Despite this adaptive response, some people seem to produce salty sweat. Their shorts and skin are crusted in white following a workout.

So what are you supposed to drink…sweat? There are a number of sports drinks on the market that contain electrolytes (i.e. Gatorade, Powerade, AllSport). These drinks also contain carbohydrates in a 4-8% concentration, which improve taste. Additionally, the carbohydrates supplement the decreasing supply of this energy source in your body during exercise. Replacing carbohydrates becomes increasingly important as workouts exceed 60 minutes. The concentration of carbohydrates in the sports drinks does not compromise the absorption of fluids in the gastrointestinal system. More concentrated sources of carbohydrates, such as orange juice will slow the absorption process.

What about all of the other additives in some sports drinks?
A combination of carbohydrates and protein in a 4:1 ratio (Accelerade) has shown promise in improving endurance when compared with carbohydrate only drinks. The protein stimulates insulin, which is involved in the transport of energy into muscle and in the conversion of glucose into its storage form, glycogen. Carbohydrates stimulate insulin, but ingestion of increased amounts will decrease absorption of fluids from the gastrointestinal tract. The addition of protein enhances the effects of insulin according to several studies.

Vitamins and minerals have been added to some sports drinks. Unless your diet is deficient in these substances, they probably do not improve performance. The amounts of these substances in sports drinks do not cause any problems.
Some drinks contain supplements; typically, the amounts present are lower than the doses recommended to achieve their purported effects. Be careful with supplements; not all of them are safe (example – recent concerns about liver failure with use of kava kava). Research these substances before you consider using any of them.
Enjoy your summer workouts by staying well hydrated. Find a drink that works well for you and drink up.

Gastrointestinal Problems

Diarrhea, also known as the Runner's trots is a tough, but not uncommon problem, especially on long training runs and races. Examine your diet and experiment with different foods and eating patterns. Foods that are high in fat content may cause a problem, but any food or drink may be the culprit. In addition to foods, make sure that you've eliminated caffeine for a day or

so prior to a long run. Also, be careful with sugar-free gum and any other substance that contains sorbitol, a bowel stimulant.

If the problem persists, you may want to try a liquid diet the day before a long run; Ensure is actually considered part of a clear liquid diet. You can consume enough calories with such a diet.
If all else fails, try Imodium prior to running. Experiment with this on long training runs to see how it affects you.

Pain in the upper abdominal (stitch) is a relatively common problem for runners. The exact cause of this problem is not known. It tends to occur in runners who are out of shape or in conditioned runners during intense workouts. One theory regarding this pain is spasm in the diaphragm due to decreases oxygen; it may also be due to irritation of the ligaments supporting the liver. Whatever the cause, pain usually subsides when exercise is stopped or intensity of exercise is decreased. You may achieve some relief by stretching your right arm over your head. Blowing out air against pursed lips when your right foot strikes the ground may help with the pain.

Avoiding carbonated beverages may help decrease the frequency of these episodes. Modify your pre-race meal, possibly just drinking liquid sources of nutrition prior to races and intense workouts.
In addition to a stitch, other causes of pain in the upper abdomen include gall bladder and liver disorders, problems in the lower lobe of the lung, along with issues related to the intestines or kidneys.

Gastroesophageal reflux disease (GERD) is a very common problem. Many factors may exacerbate this problem including certain foods (i.e. chocolate, coffee, citric juices, tomato products, alcohol, etc.), medications and exercise. The greater the intensity of the exercise, the worse the GERD tends to be. Modifying diet and taking medications are the main means of controlling this problem.

Medications used to treat GERD include: antacids, H_2 blockers (i.e. Tagamet, Zantac, Pepcid, Axid), and proton pump inhibitors(i.e. Prevacid, Prilosec, Nexium, pantoloc). You may need to try a combination of these medications in addition to modifying your diet.

If gastritis is present (or if someone has an ulcer), evaluation for *Helicobacter pylori* should be performed. Eradicating these bacteria, if present, has been beneficial in the treatment of chronic or recurrent upper gastrointestinal disorders.

Asthma – It Takes Your Breath Away

Spring is in the air and so are many allergens and other lung irritants. Asthma sufferers often experience an increase in symptoms during this season.

What is asthma? Basically, it's the inability to breathe normally. In a healthy respiratory system, inhaled air passes into through progressively smaller airways to reach small sacs called alveoli. In these sacs, oxygen and carbon dioxide are exchanged. The air to be exhaled then passes through progressively larger airways. In asthma, the muscles lining the airways constrict, narrowing the passageway; an irritant, i.e. respiratory infection, pollen, exercise, and emotional stress, usually triggers the attack. A number of people have an allergy to aspirin and other anti-inflammatory medications (ibuprofen, naproxen, etc.) which may trigger an asthma attack. The airway constriction causes wheezing, coughing, chest tightness and shortness of breath.

In the past two decades, the medical management of asthma has changed significantly. It is now recognized as an inflammatory condition caused by a cascade of chemical events in the body. Chronic asthma is classified as mild intermittent, and mild, moderate and severe persistent. Additionally, there is an entity called exercise induced asthma. Many people with chronic asthma have symptoms with exercise, though most people with exercise induced asthma do not have chronic asthma.

How is asthma diagnosed? After obtaining a thorough history and performing a physical exam, your physician may order pulmonary function tests. Using a spirometer, an instrument which measures inspired and expired air, the maximum air volume and the rate at which air moves through the airways can be assessed. An asthma medication may be administered and the tests repeated, looking for any change in the readings. These tests are often normal in exercise-induced asthma. Your doctor may perform the tests prior to and following exercise.

Allergy testing may be performed if allergic asthma is suspected.
Asthmatics can monitor the disease using a small hand held instrument called a peak flow meter. This is especially important for patients with persistent asthma. Medication changes may be based on these readings.

There are three major components in the treatment of asthma; avoidance of irritants, quick relief medications, and long-term chronic medications.
If the asthma is triggered by allergies, treatment with medications and/or shots may be helpful. Avoidance of known irritants, i.e. cats, cigarette smoke, etc. will diminish attacks.

Cold air is a common cause of wheezing; exercising indoors can minimize symptoms. Some athletes find that wearing a facemask while exercising in cold weather diminishes problems.

Infections, such as colds, increase the likelihood of an asthma attack. You can decrease your susceptibility to illness by washing your hands frequently and

avoiding contact with objects used by multiple people. You may also want to consider receiving a flu shot in the winter.

Gastroesophageal reflux disease (GERD) may exacerbate asthma. Acid contents from the stomach splash up into the esophagus and may cause irritation of the vocal cords. This may trigger bronchospasm.

There are a number of medications used in the treatment of asthma. In the event of an asthma attack, a short acting bronchodilator is used to relieve the bronchospasm. This medication is usually inhaled, but may also be taken in oral form. This type of medication is often used prior to exercise to prevent exercise-induced asthma. The main long term chronic medication used for persistent asthma is a corticosteroid inhaler. Corticosteroids are anti-inflammatory medications, used to prevent some of the changes in the airways that may cause an asthma attack. Other medications used in persistent asthma include long acting bronchodilators, cromolyn, theophylline and a newer class of medications known as antileukotriene agents; some of these medications may be used in intermittent and exercise induced asthma.

So, what does all of this information mean to the runner with asthma? Exercise is safe for most asthmatics. Discuss symptoms with your physician and play an active role in the treatment of the disease. Careful monitoring of asthma, use of prescribed medications and common sense go a long way in allowing the athlete to remain active.

- Avoid known irritants; if you have seasonal allergies, pollen levels are the lowest early in the morning.
- Stay well hydrated; dehydration contributes to the occurrence of asthma attacks.
- Consider exercising indoors when air quality is poor.
- Warm up well prior to strenuous exercise; this may prevent attacks of exercise-induced asthma.
- Use your medications as prescribed; discuss any side effects with your physician. Do not make changes without speaking with your physician.
- Stop exercising and use your medications if asthma symptoms develop.

Although asthma is usually well controlled with medications, serious attacks may occur. Take the disease seriously.

Asthmatic athletes have won Olympic gold, set world records and had long professional sports careers. Take charge of your asthma and enjoy running.

Heart Disease

Heart disease is the number one killer of men and women in the United States. It presents many different ways ranging from undue fatigue and

shortness of breath, to chest pain. A person's first episode of chest pain may be a fatal heart attack (myocardial infarction – MI). The major risk factors for heart disease include high blood pressure (hypertension), diabetes, smoking, elevated cholesterol level, family history, sedentary lifestyle and age (men >40 and women>50). Some factors can be modified by medications and lifestyle changes - diet, exercise, smoking cessation, etc.

Exercise lowers a person's overall risk of heart disease but does not eliminate the risk. Additionally, the demands on the heart are greater during exercise, so the risk of having a heart attack are greater while running.

A physician should evaluate anyone with risk factors prior to starting an exercise program. Many people do not know if they have risk factors, such as hypertension, diabetes or elevated cholesterol levels because they have not seen a physician in a prolonged period of time; absence of symptoms does not equate with absence of disease.
When in doubt, err on the side of caution. During group runs, make sure that someone has a cell phone in case a runner has a problem. Minutes make a difference in saving heart muscle during a heart attack.

Treating Injuries at Home

There are two basic types of injuries: acute and overuse.

An **acute** injury is a sudden, somewhat violent injury. Examples: broken bones, sprains, lacerations

- *Basic first aid:*
  - Stop bleeding
  - Apply ice to the injured area
  - Immobilize or protect an injured extremity
  - Elevate the injured body part if possible
  - Apply compression to decrease swelling; **do not** make this too tight or sleep wearing a wrap
  - If you are able to tolerate them, anti-inflammatory medications (such as ibuprofen, naproxen) can help relieve inflammation and pain. Take with food and as directed on the bottle; check with your physician if you are taking other medications or have any medical conditions.

- *When to seek medical help:*
  - If a large amount of swelling occurs immediately
  - If there is a large amount or persistent bleeding
  - If there is persistent severe pain
  - If a crack, pop or tear was heard or felt at the time of injury

- Inability to use injured part

An **overuse** injury is due to low grade abnormal force applied repeatedly over a prolonged period of time. Examples: tendonitis, bursitis, stress fracture

- *Causes:*
  - Training errors (too much exercise, increasing intensity too quickly)
  - Anatomy (knock knees, flat feet, etc.)
  - Improper or poorly maintained equipment and shoes
  - Training surface and environment

- *Basic first aid:*
  - Reduce the amount and intensity of training using pain as a guide
  - Apply ice to injured area 15-20 min 3-4 times per day
  - Apply compression to decrease swelling; **do not** make this too tight or sleep
  - wearing a wrap
  - If possible, elevate the injured area
  - If you are able to tolerate them, anti-inflammatory medications (such as ibuprofen, naproxen) can help relieve inflammation and pain. Take with food and as directed on the bottle; check with your physician if you are taking other medications or have any medical conditions.
  - Determine the cause of the injury and fix it

- *When to seek medical help:*
  - Pain persists despite decreased training
  - Pain persists >10-14 days
  - Pain resolves with rest but recurs when training is resumed
  - If you must take pain medications in order to train without pain