FIT Health & Fitness Review!

In This Issue: June 2007

FIT Client of the month! Rich Burnley

Client Name: Rich Burnley

Age: 60

FIT member since: (mm/dd/yyyy) 11/2006

Goal:
-Increase overall strength, endurance and lose weight

Results:
-Have lost 30 lbs
-PR of 110kg dead lift
-Can do 30 straight leg sit-ups; originally couldn't even do 1
-PR of 1:52.4 for 500m rowing
-My wife, Debbie, now works out 2 days a week

Likes:
-Work outs with weights
-Anything that increases endurance (even Tabata occasionally)
-Giving away old clothes that are too big

Dislikes:
-Kettle ball swings
-Sore quads

Keys to your clients success:

"Rich is very consistent. He trains three days a week, rain or shine, and has missed only one session of training since he started in November 06. He pushes himself every training session. He maximizes effort for the entire hour he trains at FIT. His work ethic directly affects the rate at which he is losing weight, gaining lean muscle mass and

learning the more advanced Olympic lifts. It also makes my job easier. Last, Rich is inspired and challenged by his trainng partners every session. He partner trains all three sessions a week."

In the clients words:
"Last fall, I decided that I was tired of being overweight and out of shape, so I stopped by FIT on a Saturday morning and scheduled my first workout. Jimmy was (and continues) to be an excellent trainer and about halfway through the first workout, he asked if this was what I expected; my answer was "Exactly".

I look forward to my workouts 3 days per week and have only missed 1 workout (overslept) in over 6 months. Jimmy keeps the routines varied from "Fight Gone Bad" to Tabata to sessions with heavy weights, and I appreciate his easy going nature and his gentle but firm encouragement to complete the required number of reps."

"Connective Tissues" by Johnny Nguyen, BS, FIT Exercise Director

Symphony of the Body

Without connective tissues, your body would fall apart. Your muscles would roll up onto themselves like window shades, your skeleton would topple like toothpicks, and your organs would disperse like pudding. There would be no attachment, padding or borders for the flesh, bone and blood that shape you as a person. You'd be a blob, dispersed across the floor like a bad science fiction.

The major component of all the connective tissues in your body is collagen fiber, formed by protein filaments that align with each other in an orderly arrangement that, when observed under the microscope, appear striated like muscle cells. And like muscle cells they are also wrapped in bundles within bundles, each exhibiting strong chemical bonds that make up the true strength of connective tissue, holding your body together like superglue.

The connective tissues found in your body are tendons, ligaments, fascia, and cartilage. These elements are like the rhythm section that keeps the symphony orchestra together – without this section, the piece would sound like an orchestrated number performed by a herd of monkeys.

Tendons and Ligaments

Tendons attach muscle to bone, allowing the production of movement. Ligaments attach bone-to-bone, creating a linkage system that supports mobility. This anatomical

attachment produces movements as simple as scratching your head or as complex as conducting an orchestra.

Tendons and ligaments have relatively low vascular and nutrient supplies, so, if damaged, the healing of each is lengthy. If a tendon or a ligament completely ruptures, surgery is often required to reattach it. But the good news is that the strength of these connective tissues can be increased through exercise. The physical loading that occurs with the right type of exercise stimulates collagen fibers, often resulting in the growth and increased strength of connective tissues. Stronger tendons and ligaments, obviously, can withstand greater forces – those that life can sometime ambush you with: accidental falling and other unexpected events.

Aerobic exercises increase the circulation of blood and nutrients to these connective tissues. This influx increases the metabolism in these tissues, enhancing the replacement of old, damaged collagen fibers with new healthy ones. Cruciate ligaments in the legs of animals are found to be stronger after they ran on a treadmill. This improvement in collagen regeneration, however, does not net an increase in the amount or size of collagen fibers.

Conversely, high-intensity, heavy-loading exercise increases the amount and size of collagen fibers. A reinforced network of connective tissues – in this case thicker tendons and ligaments – is likely needed to support the ability of trained muscles to generate greater forces.

You can surmise then that a combination of aerobic exercises mixed with high-intensity and heavy-loading exercises produces optimal tendon and ligament strength. At FIT, a combination of exercise methods is generally encouraged, and one of the many benefits of this is the increase in connective tissue strength.

Fascia

Surrounding and separating your muscles into different organizational levels and groups are fibrous tissues called fascia. It covers your muscles like sausage casing, running the length of muscles and terminating into tendons, which attach to bones. The force generated by a muscle is transmitted along the fascia that covers it, and is then transferred into the tendon, and finally into the bone, ultimately causing a movement – a wave of the music conductor's baton, and an explosion into gesticulations, rhythmic movements, "hush" gestures and aggressive pointing. The symphony comes alive.

Cartilage

If ligaments connect bone to bone at their ends, then cartilage cushions their contacting surfaces. The area where two bones articulate is protected by cartilage, which is made of dense connective tissues consisting of collagen cells embedded in a firm matrix, and this tightly packed matrix can withstand amazingly large forces without damage to its surface. Your cartilage can cushion the impact of running and jumping, which often produce forces up to 7 times your own bodyweight. The shocks under your car will blow out under only 2 times the car's own weight.

While tendons and ligaments have low blood supplies, cartilage has none. This means that the cells that produce cartilage, the chondrocytes, must depend on diffusion of oxygen and nutrients from synovial fluid to stay healthy and to survive. Movement, such as that from exercise, causes negative compression in the joint capsule, drawing synovial fluid, by osmosis, into the joint to bathe cartilage with oxygen and nutrients.

Connective Tissues and Music

I like music, especially if the rhythm section is tight and strong. I like to hear the base and the percussion, beating and pounding with synchronicity. Life is better with music. And like the rhythm section that holds a great song together, the connective tissues hold the rhythm of your own body's movement together. Life is also better with movement.

"Vitamin D" by Scott Kolasinski, MS, FIT Metabolic Director

Consequences of Vitamin D Deficiency

I usually do not like to write about a single vitamin or supplement. It seems too boring for me to have to research and for you to have to read. Usually, something like a general vitamin description would be easily accessible on the Internet and I see no reason for me to regurgitate what you could easily find elsewhere.

However, there is some very interesting research regarding vitamin D that can benefit our society on an assortment of levels. For more than 20 years, there has been a dramatic increase in evidence for the pharmacologic benefits of vitamin D. Current research indicates vitamin D deficiency plays a role in causing seventeen varieties of cancer as well as heart disease, stroke, hypertension, autoimmune diseases, diabetes, depression, chronic pain, osteoarthritis,

osteoporosis, muscle weakness, muscle wasting, birth defects, and periodontal disease. Unfortunately, vitamin D deficiency research is in its infancy: spurring many questions and theories with few answers thus far, and spurring controversy on the optimal level of vitamin D.

This does not mean that vitamin D deficiency is the only cause of these diseases, or that you will not get them if you take vitamin D. What it does mean is that vitamin D, and the many ways in which it affects a person's health, can no longer be overlooked by neither the health care industry nor by individuals striving to achieve and maintain a greater state of health. What's all of the fuss about? Let us see…

The Sun Vitamin

Although rickets has been recorded in history since the second century, as early as 1650 scientists and physicians were on a 270 year search for the cure. Successful cases of rickets being cured from cod liver oil in 1827 by Brettonneau lead to the isolation and identification of this antirachitic chemical known as vitamin D. Rickets was then characterized as a disease of the bone caused by a lack of vitamin D.

Shortly after, it was discovered that you could cure infantile rickets from sun exposure.

The most efficient way to get vitamin D is from the sun. The skin contains a compound called 7-dehydrocholesterol (also called provitamin D3) which reacts with the sun's ultraviolet radiation (290 to 320 nm) to form a compound called previtamin D3. Previtamin D3 is converted into vitamin D3, also called cholecalciferol, and is quickly absorbed into our circulation via a vitamin D-binding protein.

However, the media reminds us to be careful of getting too much sun exposure because of the threat of skin cancer/melanomas. Therefore, we should be protecting ourselves with more sunscreen. Recent research is now starting to suggest that although skin melanomas are certainly a danger with increasing unprotected-ultraviolet B exposure, the lack of vitamin D we would normally produce is just as dangerous. For example, since the 1980s, scientists have recognized that the risk of developing and dying of breast, colon, prostate, ovarian, and many other cancers is increased in relation to living at higher latitudes and being more prone to developing vitamin D deficiency. This will become more important as I describe how a lack of vitamin D may be the cause of several forms of cancer.

Biologic Function

The primary function of vitamin D in humans is to maintain intracellular and extracellular calcium and phosphorus. Both minerals are essential for bone building. Vitamin D taken in through food is absorbed in the upper small intestine and

taken into our lymphatic system where it slowly “leaks” into our circulation for up to 72 hours. Individuals with upper gastro-intestinal disorders may have a tendency to suffer from vitamin D deficiency.

“Vitamin D” refers to two biologically inactive precursors - D3, explained above, and D2, also known as ergocalciferol. The former is said to be more bioactive. The latter is derived from plants and only enters the body via the diet, from consumption of foods such as oily fish, egg yolk and liver. Once vitamins D3 and D2 were discovered, and because they are largely available, both were quickly added to milk to help eradicate rickets (i.e. a bone disease that occurs because of a vitamin D deficiency) throughout the world.

Vitamin D made in the skin or ingested in the diet, however, is biologically inactive and requires a conversion first in the liver to 25-hydroxyvitamin D (25(OH)D), and then in the kidney to 1,25-dihydroxyvitamin D (1,25(OH)2D). 25-Hydroxyvitamin D is the major circulating form of vitamin D that is the best indicator of vitamin D status. 1,25-dihydroxyvitamin D is the biologically active form of vitamin D.

Once 1,25(OH)2D enters our circulation, in the presence of sufficient calcium and phosphorus concentrations, 1,25(OH)2D reacts to a specific receptor on our bone cells to aid in the mineralization of bone. However, vitamin D and its metabolites are not necessarily required for bone formation; instead, vitamin D is sensitive to the calcium and phosphorus concentrations that make this process happen.

It is believed that when blood calcium and phosphorus concentrations are low, 1,25(OH)D3 will react to the same specific receptor (located on our bone cells) on our small intestine in order to stimulate the absorption of dietary calcium and phosphorus.

Regulation of Vitamin D

Ever heard of somebody dieing from vitamin D toxicity because of too much sun exposure? No. That is because (1) vitamin D3 is very photo-sensitive when exposed to sunlight; and (2) the production of vitamin D and its metabolism are tightly regulated by the body. Once vitamin D enters the circulation, it can be stored in fat cells for later use or metabolized in the lever to 25(OH)D. This hydroxylation step is feedback regulated, meaning that if there is too much 25(OH)D, calcium or phosphorus in the blood, our body will store the vitamin D; if there is not enough vitamin D, calcium or phosphorus in the blood, more 25(OH)D will be produced by absorbing it through the skin.

The most critical step in vitamin D metabolism is the production of 1,25(OH)2D by the kidneys. The kidneys are the primary organ responsible for the amount of 1,25(OH)D in the body.

1,25-Dihydroxyvitamin D and Disease
By 1981, it was well established that 1,25(OH)2D was a calcium-regulating hormone secreted by the kidneys. At this time, it was discovered that certain tumor cells also had the same specific receptor to 1,25(OH)2D3. This lead to the discovery that when mice were injected with leukemic cells that had the 1,25(OH)2D3 receptor and some were given a dose of 1,25(OH)2D3, the mice injected with the 1,25(OH)2D3 survived the 30 day duration of the study.

Follow-up studies confirmed that 1,25(OH)2D3 was an effective antiproliferative agent of tumor cells of breast, colon, lung, prostate, and melanoma cells that possessed the 1,25(OH)2D3 receptor.

Doses of 1,25(OH)2D3 have favorably affected mice in autoimmune diseases such as type I diabetes, thyroiditis, encephalomyelitis (i.e. inflammation of the brain and spinal cord), and in prolonging the life of transplanted skin grafts.

This research has been expanded to humans. In humans, 1,25(OH)2D3 applications are now viewed as an effective treatment of psoriasis.

Since 1979, it has been recognized that people who live at higher latitudes also have a higher risk of developing hypertension. These hypertensive adults when placed in a tanning bed in order to increase their 25(OH)D levels had complete resolution of their hypertension. Today we know that 1,25(OH)2D decreases the kidney production of the blood pressure hormone renin. Renin is a hormone produced by the kidney that increases blood pressure. This may, in part, explain the role of vitamin D sufficiency in the prevention of hypertension.

Cancer
For more than 50 years, documentation in the medical literature suggests regular sun exposure is associated with substantial decreases in death rates from certain cancers and a decrease in overall cancer death rates. Recent research suggests this is a causal relationship that acts through the body's vitamin D metabolic pathways. There is compelling epidemiologic observations that suggest that living at higher latitudes is associated with increased risk of many common deadly cancers. Both prospective and retrospective studies help support the concept that it is vitamin D deficiency that is the driving force for increased risk of common cancers in people living at higher latitudes.

For instance, some evidence points to a prostate, breast and colon cancer belt in the United States, which lies in northern latitudes under more cloud cover than other regions during the year. Rates for these cancers are two to three times higher than in sunnier areas.

Scientists once thought that ONLY the kidneys had the enzyme (i.e. 25(OH)D-1?-hydroxylase (1-OHase) that activated the biologically inert 25(OH)D into 1,25(OH)2D. As previously mentioned, various tissues not related to calcium metabolism possess the specific receptor for 1,25(OH)2D. Scientists observed that certain white blood cells, macrophages, and skin cells expressed the 1-OHase, meaning they could also produce 1,25(OH)2D from 25(OH)D. As mentioned previously, 1,25(OH)2D is an effective antiproliferative agent. It has been hypothesized that the local production of 1,25(OH)2D may be critically important for proper cell growth. Therefore, cancer may develop in cells that contain 1-OHase, but they lack 25(OH)D to produce the needed 1,25(OH)2D. If we do not feed our cells the needed vitamin D, it is as if the cells retaliate with uncontrollable growth.

In the June 2007 American Journal of Clinical Nutrition, researchers found during a four-year study of 1,179 healthy, postmenopausal women (age > 55) that those taking 1,400-1,500 mg supplemental calcium plus 1,100 IU of vitamin D3 had a 60 percent or higher chance of not getting cancer than their peers. This supplementation protocol of calcium and vitamin D3 is nearly three times the US government's recommended daily amount (RDA) for each supplement.

The women, who were all Caucasian and free of known cancers for at least 10 years prior to entering the study, were randomly assigned to take daily dosages of 1,400-1,500 mg supplemental calcium, 1,400-1,500 mg supplemental calcium plus 1,100 IU of vitamin D3, or placebos.

Since some women may have entered the study with undiagnosed cancers, researchers eliminated the first-year results and examined the last three years of the study. The latter years showed even more dramatic results with the calcium/vitamin D3 group showing a 77 per cent cancer-risk reduction.

There was, however, no statistically significant difference in cancer incidence between participants taking placebos and those taking just calcium supplements.

Further studies are needed to determine whether the results applied to other populations, including men, women of all ages and different ethnic groups.

Some professionals would still suggest that until such trials are conducted, it is premature to advise anyone to take vitamin D supplements specifically for cancer prevention. In my view, taking vitamin D3 will certainly not hurt, but whether or not we have enough evidence to totally put our faith in it, is not certain. If that were the case, then that would suggest that all cancers are related to vitamin D deficiency, which is certainly not the case, but for some cancers, vitamin deficiency is the cause.

The Common Cold

Ever thought that something labeled with the term "vitamin" could be more specifically referred to as a "steroid" and "antibiotic"? Vitamin D is a steroid hormone that is also a potent antibiotic. Instead of directly killing bacteria and viruses, vitamin D increases the body's production of a class of proteins, called antimicrobial peptides [This is how hormones behave, they are made by one organ of the body (in this case, our skin) and they have an effect at another location of the body]. The 200 known antimicrobial peptides directly and rapidly destroy the cell walls of bacteria, fungi, and viruses, including the influenza virus, and play a key role in keeping the lungs free of infection.

The "Cold and Flu Season" of the Fall and Winter months could be also termed the "Vitamin D Deficiency Season." During these times of year, daylight decreases tremendously. We go to work, it is dark outside, we leave work, it is dark outside. Even if you do get some sun light, the most of the rays hit your face because the rest of your body may be covered with the cold temperatures.

This certainly has an effect on your vitamin D levels in your body. After vitamin D levels bottom out during the darkest days of the cold and flu season, vitamin D levels rise again in the spring and the incidence of colds and flu steadily decrease until they virtually disappear during the vitamin D rich summer. Your body's innate immunity, especially the production of innate antimicrobial peptides, goes up and down every year with your vitamin D levels. (Acquired immunity is quite different, those are the antibodies you slowly develop after an infection or a flu shot.) Maintaining summer-time vitamin D levels in the winter – by taking adequate amounts of vitamin D – may help prevent colds or the flu by stimulating innate immunity.

Thus far, this is still theoretical, but perhaps during the Fall and Winter, we should be taking more vitamin D than vitamin C as Linus Pauling had suggested. Also, perhaps we would not even need to get the flu shot either.

Autism

There was an article written on the Vitamin D Council website that explains a theory, and only a theory, on how autism may be caused by a lack of vitamin D. Here is the address: http://www.vitamindcouncil.com/health/autism/index.html. I would highly recommend everybody read this as it describes how people with a higher melanin concentration tend to get autism and have a vitamin D deficiency.

The author makes a very good argument and may get your wheels in your head turning, it certainly does generate some thought. There appears a correlation and there is some science that backs up the author's claims. Unfortunately, further research is needed to answer the many questions the author arises.

Recommendations

For all life-stage groups, with the exception of adults 51 years of age and older, 200 International Units (IU) per day (5mcg/day) of vitamin D is recommended. The vitamin D recommendation was revised upward from 200 IU/day in 1997, to 400 IU/day (10 mcg/day) for adults ages 51–70 and 600 IU/day (15 mcg/day) for those over 70. These revised levels reflected a new understanding of vitamin D's role in preventing osteoporosis or osteomalacia in the elderly. But many experts believe the new recommendations are still inadequate for preventing osteoporosis and other conditions associated with low vitamin D.

Interestingly, one study had children receiving 2000 IU/day of vitamin D from 1 year of age and it reduced the risk of developing type I diabetes by more than 80%. Another study had children who were vitamin D deficient at 1 year of age onward and whose course was followed had a fourfold increased risk of developing type I diabetes later in life. Therefore, we should maintain vitamin D sufficiency, especially in childhood and the adolescent years of life, not only for bone health, but for the prevention of cardiovascular heart disease, chronic diseases, including cancer, and autoimmune diseases. This suggests that vitamin D during infancy and childhood may imprint an increased risk of these chronic diseases for the rest of one's life.

Some experts believe that adults should take 800–1,000 IU daily of supplemental vitamin D to adequately prevent bone loss and possibly protect against some cancers and other chronic disorders.

The government has established the safe upper limit thus far as 2000 IU/day for children and adults. Fifteen experts

from universities, research institutes and university hospitals around the world recently called for international agencies to "reassess as a matter of high priority" dietary recommendations for vitamin D because current advice is outdated and puts the public at risk of deficiency (The American Journal of Clinical Nutrition, Vol. 85, pp. 860-868).

A review of the science reported that the tolerable upper intake level for oral vitamin D3 should be increased five-fold, from the current tolerable upper intake level UL in Europe and the US of 2000 IU, equivalent to 50 micrograms per day, to 10,000 IU (250 micrograms per day).

We really do not know the optimal level of vitamin D that will satisfy the entire population. There are too many confounding factors, the skin's melanin pigment, sunscreen, age, latitude, and time/season of year, that influence the skin's production of vitamin D.

If you want to get your vitamin D from the sun, but you are worried about developing skin melanomas, put sunscreen on that has a minimum 15 for sun protection after 15-20 minutes of sun exposure.

Toxicity

It is very difficult to take too much vitamin D. The safe upper limit is 2000 IU/day for children and adults, which gives a blood result of 55-60 ng/ml of 25(OH)D. However, people who are in the sun for hours, such as lifeguards, can generate 150 ng/ml of 25(OH)D, which would require ingesting more than 10,000 IU/day for prolonged periods.

Theoretically, intoxication is always a possibility. Those diagnosed with vitamin D intoxication had ingested hundreds of thousands to a million units of vitamin D a day, achieving a blood 25(OH)D level of 400-500 ng/ml!

Summary

The short and sweet version of this is:

- Get 10-20 minutes of sun exposure, depending on the time of day. From 10 am – 3 pm, the ultraviolet rays are the most intense.
- A blood result of 55-60 ng/ml is considered normal. Have your checked with a blood test.
- Get at least 400 IU/day of vitamin D from dietary sources or supplements along with your daily sun exposure. If not, you may need 1000-2000 IU/day.
- Most vitamins have 400 IU/day.
- Babies, pregnant women, the elderly, high-latitude living people and heavy-melanin containing people are the most susceptible for having a vitamin D deficiency-link disease that could have been potentially prevented with enough consistent sun exposure.

• 1,25(OH)(2)D receptors are present not only in the intestine and bone, but in a wide variety of other tissues, including the brain, heart, stomach, pancreas, activated T and B lymphocytes, skin, gonads, etc.
• Not only does vitamin D deficiency cause rickets in children, osteomalacia and osteoporosis in adults, but may have long lasting effects. Chronic vitamin D deficiency may have serious adverse consequences, including increased risk of hypertension, multiple sclerosis, the common cold, hypertension, autism, cancers of the colon, prostate, breast, ovary, and type 1 diabetes.
• There needs to be a better appreciation of the importance of vitamin D for overall health and well being.

For any questions or a list of references on this article, please email at scott@focusedtrainers.com.

Until next time, get out there and get some sun!

"Lesser Known Benefits of Exercise" by Gabe Rinaldi MA, FIT General Manager

At FIT it is common for us to talk about reducing fat, increasing muscle, and reducing the risk of many diseases, but there are a multitude of less commonly known benefits of exercise that also deserve mention. For this newsletter article I spent some time searching the web to come up with some of these less commonly known benefits. In some cases the benefits may seem logical when presented, but they are included to show that there is supporting scientific evidence. These benefits are simply listed below with a website link as a reference or to serve as a place to gather more information.

Sexual Desirability and Sexual Performance

http://www.ejhs.org/volume7/fitness.html

Enhanced work performance

Improve psychological well-being

Reduce depression and anxiety

http://www2.gsu.edu/~wwwfit/benefits.html

Skin tone, making your skin look more elastic

Ability to relax

Frustration with daily problems; allows for a more

constructive response to disappointments and failures

Provides an easy way to share activities with family and friends and an opportunity to meet new friends

http://www.mckinley.uiuc.edu/Handouts/exercise_benefits.html

Helps older adults become stronger and better able to move about without falling

http://www.cdc.gov/nccdphp/sgr/ataglan.htm

A more favorable experience with pregnancy outcomes

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?itool=abstractplus&db=pubmed&cmd=Retrieve&dopt=abstractplus&list_uids=3688075

Improved sleep quality

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=pubmed&cmd=Retrieve&dopt=AbstractPlus&list_uids=17517356&query_hl=5&itool=pubmed_docsum

Exercise at a younger age may prevent fragility fractures in old age

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=pubmed&cmd=Retrieve&dopt=AbstractPlus&list_uids=17505123&query_hl=7&itool=pubmed_docsum

Exercise may help combat fatigue caused by various cancer therapies

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=pubmed&cmd=Retrieve&dopt=AbstractPlus&list_uids=17399841&query_hl=11&itool=pubmed_docsum

I could go on and on, but it might be fun to take this topic to the FIT forum. If you come across an exercise benefit that you think is a bit out of the ordinary, then please post it up on the following thread on our forum.

http://www.focusedtrainers.com/forum/showthread.php?p=4005#post4005

"Achilles Tendon Ruptures" Chris Reed MPT, OCS, ATC

In this issue I would like to discuss a topic that tends to come up over the summer months. With the weather turning warm, many of us are turning to outdoor activities for our exercise. These activities often include a pick-up game of basketball at the park, a run in the hills at Rancho, or a game of volleyball at the beach in Santa Cruz. All of these activities can place the middle-aged athlete at greater risk for an Achilles tendon rupture. In this article we will cover the anatomy and physiology of the Achilles tendon, common mechanisms of injury, treatment, and prevention strategies.

The Achilles tendon is a thick fibrous tendon that attaches the gastrocnemious and soleus muscles in the calf to the calcaneus, or heel bone. This strong ropelike structure is the largest tendon in the human body. When the calf muscle contracts, tension is placed through the Achilles tendon causing it to pull on the calcaneus and move the foot downward, or into dorsiflexion. The Achilles tendon allows us to go up onto our tiptoes, walk, run, and jump normally.

Age and lack of use commonly weaken the Achilles tendon over time. The middle aged male weekend warrior has the greatest likelihood of rupturing an Achilles tendon. Sports that involve running, jumping, pivoting, and sudden quick changes in direction have a greater incidence of Achilles tendon ruptures associated with them. These sports include basketball, tennis, racquetball, and volleyball. The mechanism of injury is generally an overstretching of the tendon while it is being loaded. Other causes include running in the hills, overuse, poor stretching habits, worn out shoes, and flat feet.

Often times people report the feeling of rupturing the Achilles tendon as if someone stepped on their heel or whacked them in the heel with a bat. A loud pop or crack is commonly felt and/or heard at the time of the injury. There is pain and swelling that develops at the back of the ankle. The area of the tear can be palpated as a gap or depression in the tendon and is commonly located about 2 inches above the heel. The athlete will have an inability to push up onto their toes or to push of while walking.

Initial treatment should include rest, ice, compression, and elevation of the injured limb. It is recommended that the athlete who is suspected of suffering from an Achilles rupture see a surgeon as soon as possible. The surgeon will ask several questions about how the injury occurred and perform a couple of tests in the office to make the clinical diagnosis. If a partial tear is suspected, the surgeon may elect to get an MRI of the injured ankle. The surgeon will discuss operative and non-operative options to treating the injury. For the more active and athletic population it is often recommended that the rupture be surgically repaired. This allows for the athlete to get back to their sport sooner, stronger, and with less risk of re-rupturing the repaired tendon than treating the injury non-surgically.

Following surgery, the athlete will spend between 6-12 weeks in a walking boot. At about the 3-4 week mark physical therapy begins. Over the next

3-4 months you will work to regain the mobility in the Achilles tendon, regain your calf strength as well as the strength in the rest of your leg. It will be 6-9 months before you are able to resume your sport activities.

To reduce your risk of developing an Achilles tendon problem, the following steps are recommended. Remember to perform a slow controlled stretch prior to partaking in any activity. Try to cross train using higher impact activities and lower impact activities on alternate days. Don't exercise through pain. Strengthen your calf muscles by doing 3 sets of 25 heel raises. Start by doing it on both feet together. Eventually, you can move to doing one leg at a time. Remember to ice following exercise.

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"Transtheoretical Model of Change" by Karen Kieffer *MA, USAWL

Change is challenging. It is a gradual process that evolves over time and may take several attempts. Behavior and the process of change has been the subject of many studies and several theories. One theory, the Transtheoretical Model, divides the process of change into six unique stages that require different strategies for success.

Pre-contemplation stage: Not considering or wanting to change behavior. Typically, people in this stage deny having a problem and do not intend on initiating change unless pressured by others.
Strategy: Education is the most productive strategy. People may not understand how the behavior is negatively affecting their health and quality of life. Knowledge is power.

Contemplation stage: Although people in this are not quite ready for change, they acknowledge there is a problem and are seriously considering overcoming it.
Strategy: Education and peer support are very important at this stage. Creating a support system of friends and family to encourage, listen and motivate will be valuable, especially when self-motivation is low.

Preparation: In this stage, people are seriously considering

and planning behavior changes within the next few months and may even engage in the new behavior for a short time.
Strategy: Strategies for this stage should focus on developing an action plan with specific objectives and completion dates, and creating a positive physical and emotional environment to support the new behaviors.

Action: In the action stage written objectives are followed and new behaviors are actively pursued. Relapse and regression are common in this stage.
Strategy: Don't give up. Realize setbacks will happen and be aware of obstacles. Take this opportunity to recognize progress, acknowledge achievements, as well as re-evaluate action plan and refocus objectives.

Maintenance: Once the action stage has been maintained for six consecutive months, people move into the maintenance stage. During the maintenance stage, the new behavior continues to be sustained for up to five years.
Strategy: This stage requires continued adherence to specific objectives and reinforcement of accomplishments. People in this stage strive to prevent relapses.

Adoption: Once the new behavior has been maintained for more than five years, the behavior has been adopted. Many experts believe that at this stage compliance with the new behavior is no longer a challenge, and people successfully exit the cycle of change with out fear of relapse.

Karen Kieffer
Exercise Physiology Graduate student San Jose State University
FIT Personal Trainer

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