Active Bones
Orthopaedic Surgery and Sports Medicine
Teaching and Research Foundation Newsletter

otrfund.org

Fall 2016

Dear Reader:

The warm rays of sunlight, combined with the multicolored spectrum of leaves, signal the beginning of fall and a return to school. It is hard to miss the sight of youngsters running on the track, through parks and fields, or even down the street. It's cross country season. In order to avoid leg injuries while running, you will find an informative article about how to prevent the bane of runners everywhere—stress fractures. This issue also contains an article on patellar (kneecap) dislocations. We tend to see this injury more often in the fall and winter because of sports such as football, hockey and wrestling. Like any injury, though, a patellar dislocation can occur anytime as detailed in our first article.

Traveling—either for pleasure or business—interrupts our daily exercise regimen, even though we tell ourselves we'll hit the hotel workout room, pool or go for a run/walk. Somehow that doesn't seem to happen. To help you stay in shape throughout your trip, we've put together some exercises that are easy to do in any size space—indoors or out.

While exercising is essential to a healthy lifestyle, some exercise routines are not as beneficial as their advertisements and infomercials claim. In another article, we review different exercise programs and dissect their negative and positive aspects. We also offer advice on how to find the right type of fitness routine for you, and give instructions on how to perform several simple exercises that are proven to work and will help you get on track without the need of an online purchase or coupon for free shipping.

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Orthopaedic Surgery & Sports Medicine
Teaching & Research Foundation

Patellar Dislocations: Gruesome looking but treatable

by
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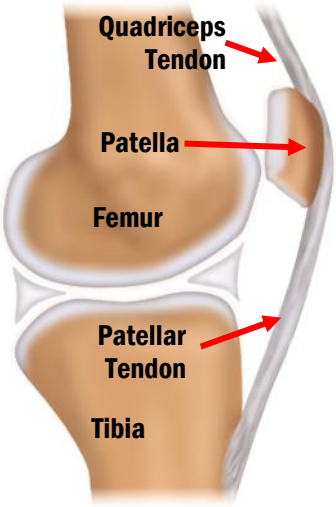
The patella (kneecap) rests in the trochlea (groove) along the front of the femur (upper thigh bone). The quadriceps muscle along the front of our thigh contracts to forcefully straighten the knee joint by its attachment of the quadriceps tendon through the patella (kneecap) to the patellar tendon and eventually the tibia (lower leg bone). Forceful contraction of the quadriceps with the knee in a malaligned valgus (knock-kneed) position can generate sufficient lateral (to the outside) force to violently pull the patella out of the trochlear groove and dislocate the patella.



When a kneecap dislocates, the most important thing is to make sure the patella returned to its proper position. This is called a reduction and tends to occur spontaneously. If it does not self-reduce, the pain and a gross deformity of the knee continues and gently straightening the knee will allow the patella to reduce and return to its proper position.

After reduction, we recommend immediate icing (20 minutes at a time, three times per day), restriction of activity and crutch use to limit pain and further instability. Within a few hours, the knee will typically swell. Working to straighten the knee and fire the quadriceps muscle on the front of the thigh can help prevent muscle atrophy and speed recovery.

Image shows a patella that dislocated laterally out of the trochlea (groove).

Following the injury, you should be evaluated by a physician specializing in sports medicine. X-rays should be taken to identify any fractures or persistent dislocation. If there is significant swelling and signs of injury, an MRI should be ordered to see if there is any cartilage damage, loose bodies and/or torn ligaments or tendons. The majority of uncomplicated, one-time patellar dislocations (no fractures, loose fragments of cartilage or significant tendon and ligament injuries) are treated conservatively with ice, bracing, nonsteroidal anti-inflammatory medications and physical therapy

Orthopaedic surgeons typically do not recommend braces and encourage early range of motion and aggressive rehabilitation for uncomplicated patella dislocations. Most patients are prescribed physical therapy to participate in a progressive exercise program that restores range of motion, strength and eventually functional and athletic movements. There is an emphasis on good form and control of knee and body position with these movements. Rehabilitation also includes work on range of motion and strengthening of the hips, core and quadriceps musculature. The majority of patients recover completely with this conservative treatment and typically return to sport and activity in four to six weeks.

Continued on page 8

Running Away From Stress Fractures

Now that fall is here a multitude of athletes are tying up their laces in preparation for the cross country running and football seasons. While a great workout, long-distance running may be taxing on the shins, and it may lead to stress fractures.

A stress fracture is an injury to a bone resulting from excessive repetitive stress. Bone is very active and remodels according to the stress it sees. However, when exposure to stress is too high or too long this puts too much stress on the bone and the bone eventually breaks under the force. The tibia, the larger bone in the lower leg, is a common location for stress fractures to occur.

Stress fractures may present with some of the following signs/symptoms:

- Pain with weight-bearing (loading) and tenderness to pressure over a bone.
- Pain progresses with the loading activity. The greater the duration of loading, the more the pain increases. Conversely, the pain tends to improve with rest and avoidance of loading.
- Usually occurs following a significant increase in intensity, duration or frequency of weight-bearing activity.

Shin splints are different from stress fractures and can be easily be confused. That's why it is important to notify your physician if you have any of the above symptoms. Last summer, Chicago Bears wide receiver Kevin White was originally diagnosed with shin splints that turned out to be stress fractures. Unfortunately, White had to sit out the entire 2015 season.

Shin splints present with pain and tenderness along the inside of the lower leg—a very distinct site where lower leg muscles originate and cause pain from chronically pulling on the bone surface. Unlike a stress fracture, pain from shin splints can improve as you warm up and continue to participate in a weight-bearing activity, while pain from stress fractures tends to increase with continued activity and improves only when the activity stops and with rest.

There are some risk factors to stress fractures. These include, but are not limited to:

- A previous stress fracture, especially at that same area.
- Bone problems such as osteoporosis, osteopenia, or tumors. These weaken bone strength and make them more susceptible to injury, especially fractures.
- Systemic disorders such as hormonal or metabolic issues.
- Poor nutrition. Insufficient calories to support the bone and other bone regulating hormones like estrogen. Amenorrhea (lack of menses) is a sign of insufficient energy (calorie intake versus calorie expenditure).
- Poor or improper footwear.
- Improper training with rapid increases in intensity, duration and frequency of activity.

Continued on page 8

Fads: the Good and the Bad

Everyone has seen them. Those late night infomercials or ads starting January 2nd touting and selling the "greatest" exercise machine, program or diet to help you get into shape and look as if you could win a body building contest tomorrow. Some have merit, most don't. Some are even dangerous. We took a look at some of the more popular programs and devices to see how they compare with researched and proven exercises that will benefit you for the long term.

The best way to lose weight!

Exercise! That may be over simplifying things a bit, but consensus among medical professionals is that one of the main keys to weight loss is physical activity. There are a lot of exercise programs on the market that claim to have the ability to help you become leaner and fit, and report being "The best way to lose weight!." Some of these products are specific pieces of equipment, others are programs that look to provide structure to your workouts.

Among the latter, you will find such programs as P90X, Boot Camps, and Tae Bo. Often the goal of programs such as these is to show considerable changes in weight and figure quickly. The designers of these programs know that people will likely only continue to use the program if they see results early. However, each of these programs has a different risk of injury depending on how intense the workouts are, and there is generally no prerequisite to participation in one of these programs. The combination of these two factors is what is concerning about sedentary individuals jumping into one of these programs without proper guidance.

On the other end of the fad exercise genre, there are specific pieces of equipment that sometimes claim to do it all. Examples of these are abundant. Some of the more recent creations are the Shake Weight and Ab Muscle Stimulator. However, this is not a new idea. For years there have been similar inventions from the Thigh Master all the way back to the vibrating belt. Often times these inventions are based on sound scientific theories, but the expected results are not as easily obtained as the promotions make it seem. Similar tools often are used in rehabilitation, but instead of it being the focus of the treatment, they are used as a part of the program.

What they got right

Despite some obvious flaws in perception of how they should be used, programs such as the P90X have good qualities, and there are safe ways to use them. One of the positive qualities that these programs instill is the ability to make exercise a part of your daily routine. People often use lack of time as an excuse for participation in exercise. One way to overcome this barrier is by scheduling your exercise into your week.

Continued on next page

Continued from page 6

For some of us, religious commitments occur on the same day of the week and we know not to schedule during that time. A similar mindset can be used to ensure you get regular exercise. Find a time in your weekly schedule and dedicate that to exercise (i.e. after church or after work instead of sitting in traffic). When doing this, make sure to stick to your schedule, and if you are feeling time pressures you may want to shorten the amount of exercise you do, but don't eliminate it fully. For example, instead of riding your bike for 10 minutes, do 30 minutes of strength training and walking for 10 minutes. You may decide to do 20 minutes of strength training and walk for five minutes.

If even that is not realistic because your schedule is "too busy," then find ways during the day to incorporate exercise. You will be required to make small changes in your habits, but with a little effort it will lead to long term gains. One simple way to increase your activity level is to park your car a few spots further from your location. This will get you walking an extra 50- to 100-feet, and over the course of a day it could add up to larger cardiovascular gains.

One other positive concept that these programs try to engrain is the need for strength training along with cardiovascular training. Just running and/or walking may get you to your goal weight, but to be healthier overall it is important to increase you muscular strength as well. This will help to decrease stress on the body during daily activities (i.e. carrying laundry basket or groceries.) Parking further away to encourage walking may not be a new idea to most, but how about incorporating strengthening exercises into your day? For those that spend a lot of time on the phone or at a desk, try to start performing some basic exercises every hour or two throughout the day.

Manual laborers tend to find it hard to exercise at the end of a day because their job is "too physically demanding." If that's you, try occasionally performing a few simple exercises throughout the day to appropriately strengthen specific muscle groups outside of just job specific movements. The goal when getting started with exercise is to make these little things a part of your normal routine and build a foundation of physical activity.

In the end, remember that exercise should be fun! If you aren't enjoying yourself, then the chances are that you won't continue to do it. You should not perform any exercise that causes pain. If you are unsure whether you should exercise because of a medical condition, you should contact a physician. Also, if you have difficulty telling the difference between soreness after exercise and pain that may be damaging tissue in your body, then you should seek assistance from a professional (i.e. physical therapist, physician, certified personal trainer). Last, if you would like recommendations on specific exercises that may be useful for your individual goals and job demands, then reach out to a local medical professional.

OTRF's Alternate Exercise Program

	Exercise	Week 1	Week 2	Week 3	Week 4	Weeks 5-8 (Repeat weeks 1-4 & add below)
Day 1	**Squats**	30 sec.	30 sec.	30 sec.	1 min.	Add 10-15 lb. weights. Hold on shoulders
	Bridge	30 sec.	30 sec.	30 sec.	1 min.	Place feet on plastic furniture sliders/movers
	Jumping Jacks	30 sec.	30 sec.	30 sec.	1 min.	
		Rest 1 minute after completing all three exercises above, then repeat as specified below				
		Repeat 2x	Repeat 3x	Repeat 4x	Repeat 3x	
	Pushups	30 sec.	30 sec.	30 sec.	1 min.	Do with straight legs, or put feet on sofa
	Shoulder Press	30 sec.	30 sec.	30 sec.	1 min.	Add 5-10 lb. weight or step closer to band handles
	Mountain Climbers	30 sec.	30 sec.	30 sec.	1 min.	Place feet on plastic furniture sliders/movers
		Rest 1 minute after completing all three exercises above, then repeat as specified below				
		Repeat 2x	Repeat 3x	Repeat 4x	Repeat 3x	
Day 2	**Seated Rows**	30 sec.	30 sec.	30 sec.	1 min.	Use harder band
	Bentover Reverse Flys	30 sec.	30 sec.	30 sec.	1 min.	Use 5-10 lb. dumbbells
	Burpees	30 sec.	30 sec.	30 sec.	1 min.	
		Rest 1 minute after completing all three exercises above, then repeat as specified below				
		Repeat 2x	Repeat 3x	Repeat 4x	Repeat 3x	
	Tricep Extension	30 sec.	30 sec.	30 sec.	1 min.	Use a harder band or step closer to band handle
	Arm Raises 45° with Weights	30 sec.	30 sec.	30 sec.	1 min.	Increase by 5 lbs. or follow band instructions above
	Jog in Place	30 sec.	30 sec.	30 sec.	1 min.	
		Rest 1 minute after completing all three exercises above, then repeat as specified below				
		Repeat 2x	Repeat 3x	Repeat 4x	Repeat 3x	
Day 3	**Squat to Press**	1 min. Rest 30 sec.	1 min. Rest 30 sec.	1 min. Rest 30 sec.	1 min. Rest 15 sec.	Add 10-15 lbs.
	Pushup and Row	30 sec. **Rest 30 sec.** Repeat 2x	45 sec. **Rest 30 sec.** Repeat 3x	1 min. **Rest 30 sec.** Repeat 4x	1 min. **Rest 15 sec.** Repeat 4x	Add 5-10 lbs.
	Plank	1 min.. Rest 30 sec.	1 min.. Rest 30 sec.	1 min.. Rest 30 sec.	1 min.. Rest 15 sec.	Alternate lifting feet
	Side Plank on Knees	30 sec. **Rest 30 sec.** Repeat 2x	30 sec. **Rest 30 sec.** Repeat 3x	30 sec. **Rest 15 sec.** Repeat 4x	30 sec. **Rest 15 sec.** Repeat 4x	Do on straight legs with feet stacked or lift top leg
	Dead Bug Alternating Arms and Legs	1 min.. Rest 30 sec.	1 min.. Rest 30 sec.	1 min.. Rest 30 sec.	1 min.. Rest 15 sec.	Move arms and legs at the same time
	Russian Twist	30 sec. **Rest 30 sec.** Repeat 2x	30 sec. **Rest 30 sec.** Repeat 3x	30 sec. **Rest 15 sec.** Repeat 4x	30 sec. **Rest 15 sec.** Repeat 4x	Add 5-10 lb. dumbbell Move weight, don't rotate

Alternative Exercise Routine to Fad Programs is Safer, More Controlled

The table on the opposite page presents a four-week exercise routine that does not require costly equipment or devices like many of the fad and popular programs on the market today. This makes them flexible and convenient so they can be performed in most places—at home, in the gym, in the yard, and even in hotel rooms. Additionally, the exercises addressed in this table work muscle groups the fad programs attempt to target, but in a safer and more controlled method.

To extend the OTRF program to 12weeks:
Cut the rest times by 15 seconds only for Day 1 and Day 2 exercises and repeat the 5-8 week program. For Day 3 exercises, repeat the 5-8 week program, **BUT** rest after every other exercise for the specified time shown in bold type (i.e., perform the squat to press exercise then the pushup and row exercise before resting 15 seconds.)

Before starting this program or any other, consult your physician. Never exercise beyond the level at which you feel comfortable. If at any time your feel you are exercising beyond your current fitness abilities, or feel discomfort, discontinue the exercise immediately and reconsider your participation in this program.

Exercises for Excursions

Whether its vacation, a business trip, or a weekend adventure, it is essential to keep active when on the road. A non-consistent use of muscles may result in decreased strength, muscle mass, and overall fitness, and therefore you should develop an exercise routine designed specifically for travelling. Here are some great exercises to consider when you are on the go:

- Tighten your abs while sitting. Pull your belly button in and work up to five minutes.
- Swim or run laps at the hotel pool for at least ten minutes. Even though ten minutes is short, any exercise helps.
- If your vacation takes you to the ocean, rather than sitting on the beach all day, rent a bike, kayak, paddle board, or throw a Frisbee around. Trying a new activity can help burn some extra calories.
- Stay at a hotel that has a gym and go before and/or after meetings.
- Pack several resistance bands—they give you resistance so that you can work your arms and legs beyond the constraints of body weight.
- If your vacation destination is at a beach, go for a run. Try to run on firm sand, and avoid loose terrain. Firm ground is less stressful on your ankles and joints because of decreased leg twisting when you push off.
- While waiting in the security line of any type of station, make use of this time to stretch. Areas that are the easiest to stretch are your neck, thighs, and shoulders.

Patellar Dislocations: Gruesome looking but treatable

Continued from page 2

Early surgical intervention may be necessary to remove or repair a large loose cartilage and/or bony fragment, or to repair other injured ligaments or tendons. For patients with recurrent dislocations, surgery may be required to reconstruct the medial patellofemoral ligament (MPFL) to prevent further dislocations and injury to the knee joint. Variations in anatomy also may increase the risk for re-dislocation including a shallow trochlea (groove), an underdeveloped patella, generalized laxity in the tissues, patella alta (high-riding kneecap), valgus knee alignment (knocked knees), lateralization of the tibial tubercle, and increased femoral anteversion (rotational deformity in the thigh bone), to name but a few. These factors are taken into consideration if surgical intervention is contemplated.

Nevertheless, simple patellar dislocations are not uncommon and the majority can achieve good outcomes with conservative treatment and aggressive rehabilitation. Surgical management, when necessary, reliably restores patellar stability and can allow a full return to athletics and other recreational activities.

Running Away From Stress Fractures

Continued from page 3

Stress fractures are preventable because bone has the ability to get stronger and adapt to the stresses it experiences as long as the intensity, duration and frequency of activity is increased gradually with sufficient rest and recovery time between workouts. Some ways to prevent stress fractures include:

- Having a consistent and proper warm-up prior to any activity or exercise. This helps prepare muscles and bones for upcoming activities.
- Train properly by progressing exercise intensity, duration and frequency gradually so as not to overstress bone past its threshold.
- Allow adequate time for rest and recovery to allow bones to remodel and adapt (get stronger) following a workout.
- Proper footwear is helpful as this will give distribute and dissipate forces to the bones.
- Maintain good nutrition with plenty of calories, calcium and vitamin D.
- Maintain a healthy balanced diet where calorie intake matches calorie expenditure.
- For women, make sure you menstruate regularly by eating enough calories to support your exercise level.
- Supplement endurance exercise with resistance (weightlifting) training to encourage good bone strength.

Arrow above points to a stress fracture that appears as a pale white line on this X-ray

Research Roundup

Exercise: Sprint Training vs. Moderate Training

According to a recent study conducted by McMaster University in Ontario, Canada, the physiological effects of sprint interval training (SIT) are congruent with the effects of moderate-intensity continuous training (MICT). Sprint interval training consists of several short periods of intense exercise, each followed by a period of low-intensity exercise, whereas moderate-intensity continuous exercise is characterized by a constant level of moderate exercise for a long period of time.

Over a period of 12 weeks, researchers recorded the changes in body fat, heart and lung fitness, blood sugar control, and skeletal muscle content in participants who were deemed inactive by an International Physical Activity Questionnaire. The total body fat percentage in all participants decreased by 2%, and the maximum oxygen intake increased by about 19% for both the SIT and MICT groups. Additionally, the body's ability to absorb blood sugar similarly increased in both groups, and the concentration of an energy-metabolizing protein in muscle cells increased by 48% and 27% in the SIT and MICT groups, respectively

Twelve weeks of sprint interval training decreased body fat and increased cardiorespiratory fitness, blood sugar control, and skeletal muscle fitness to the same degree as moderate-intensity training; the only difference between these two exercise methodologies is the length of time that each one involved. A session of SIT took 10 minutes, whereas a session of MICT took 45 minutes—almost an 80 percent difference in time commitment. While SIT may appear to be a better option than MICT with regards to time commitment, not all people have the level of physical activity, fitness, and motivation that SIT requires.

USDA bans chemicals used in antibacterial soaps

The U.S. Food and Drug Administration (FDA) recently announced that manufacturers of over-the-counter consumer antiseptic wash products containing at least one of 19 specific active ingredients, including triclosan and triclocarban, will no longer be allowed to market those products.

According to the U.S. Food and Drug Administration (FDA), there isn't enough science to show that over-the-counter (OTC) antibacterial soaps are better at preventing illness than washing with plain soap and water. In 2013, the FDA requested safety and efficacy data from manufacturers, consumers, and others if they wanted to continue marketing antibacterial products containing those ingredients. However, the FDA received very little information. Consequently, the FDA recently issued a compliance ruling that bans the questionable chemical only in consumer antibacterial soaps and body washes used with water. It does not apply to hand sanitizers, hand wipes or antibacterial soaps used in healthcare settings.

"Following simple hand washing practices is one of the most effective ways to prevent the spread of many types of infection and illness at home, at school and elsewhere," said Theresa M. Michele, MD, of the FDA's Division of Nonprescription Drug Products. "We can't advise this enough. It's simple, and it works."

Research Roundup

Continued from page 9

The Coffee Curiosity

Coffee has a bigger impact on your health than the caffeinated high it produces several seconds after the first sip. Griffith University in Gold Coast, Australia, determined that coffee has a positive psychological and metabolic effect on exercise routines—specifically on general mood and energy utilization. The World Health Organization's International Agency for Research on Cancer (WHO-IARC) also conducted a study that examined the connection between coffee and esophageal cancer.

Griffith University studied the physiological and metabolic effects of caffeine in a group of people who exercised on a regular basis. For the experiment, researchers split 14 people who were deemed physically active into three separate groups: a control, a placebo, and a caffeine group. Each group underwent a four hour routine that consisted of a period of exercise and rest, blood tests, psychological evaluations, and lunch. The caffeine group's evaluations reflected a reduction in muscle pain and an increase in the enjoyment of the exercise compared to the placebo and control groups.

In order to discover the metabolic effects of caffeine during exercise, researchers assessed the amount of lunch that was consumed and recorded the energy output and chemical composition of respiration during the workout. These calculations revealed that caffeine caused a greater energy expenditure during the workout, decreased fat consumption, increased fat oxidation (burning fat), and suppressed hunger at the end of the workout.

The metabolic effects of caffeine require a long term exercise routine in order to produce substantial results, as caffeine only slightly influences short term exercise routines. Additionally, more research must be conducted in order to examine the roles of tolerance, as tolerance to caffeine may decrease metabolic effects. The results in this study can be expanded by conducting an experiment that investigates how manipulating variables such as intensity, time, and type of exercise will impact the metabolic and psychological effects of caffeine.

The WHO-IARC recently determined that coffee, specifically the chemical composition of coffee, is not carcinogenic; however, the agency classified hot beverages as "probably carcinogenic to humans", as hot beverages may cause esophageal cancer. Their study consisted of analyzing patterns in countries such as China, the Islamic Republic of Iran, Turkey, and South America. Hot beverages are commonly ingested in these regions, and these regions revealed an elevated appearance of esophageal cancer.

Esophageal cancer begins in the esophagus, and occurs when cancerous esophageal cells travel to other parts of the body and produce tumors. This cancer is the 8th most common cause of cancer in the world, and is responsible for five percent of all cancer deaths. While limited evidence suggests that the elevated temperature of drinks such as coffee, tea, and mate may cause esophageal cancer, the magnitude of esophageal cancer cases that are linked to the ingestion of hot beverages is currently unknown.

Whether coffee promotes the positive effects of exercise or causes cancer at hot temperatures, more research must be conducted in order to expand and support the claims depicted in these studies.

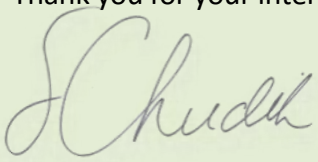
Orthopaedic Surgery and Sports Medicine Teaching and Research Foundation helps people stay fit and healthy

Steven Chudik, orthopaedic surgeon and sports medicine physician with the Steven Chudik Shoulder and Knee Injury Clinic, founded the Orthopaedic Surgery and Sports Medicine Teaching and Research Foundation (OTRF) in 2007. OTRF is a nonprofit, 501 (c)(3) organization dedicated to funding research and education for the purpose of keeping people active and healthy.

Dr. Chudik has seen a growing demand by patients, athletic trainers and clinicians for up-to-date medical information and unbiased research on injury prevention—especially for children—as well as facts on arthritis and wear and tear on joints, cartilage, tendons, ligaments, etc. To fulfill these requests, OTRF produces and distributes this newsletter, shares information about health performance-related issues like nutrition and fitness, hosts athletic training educational programs, conducts seminars for healthcare providers and the community and most important, funds unbiased research and development particularly in emerging areas such as arthroscopic and minimally invasive surgery for injuries to the meniscus, labrum, rotator cuff, ACL and cartilage.

However, none of this is possible without ongoing financial support. We are extremely grateful to all those who have contributed in the past. Many of the donations came from patients or their family members who benefited from Dr. Chudik's orthopaedic and sports medicine expertise. If you might be interested in helping us continue our research, please visit our website, ***otrfund.org*** and click on the donation link. Or, if you prefer, email me at **contactus@chudikmd.com/**. Also, many companies sponsor programs that match charitable contributions made by their employees. Some even match donations made by retirees and/or spouses. Matching gift programs are a great way to double your generosity. Regardless of the amount, every contribution helps make a difference.

Thank you for your interest in our newsletter, ***Active Bones***, and the ongoing work of OTRF.



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Sports Medicine Injury Clinic

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