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Carpal Tunnel Syndrome QUESTIONS FOR A SPECIALIST

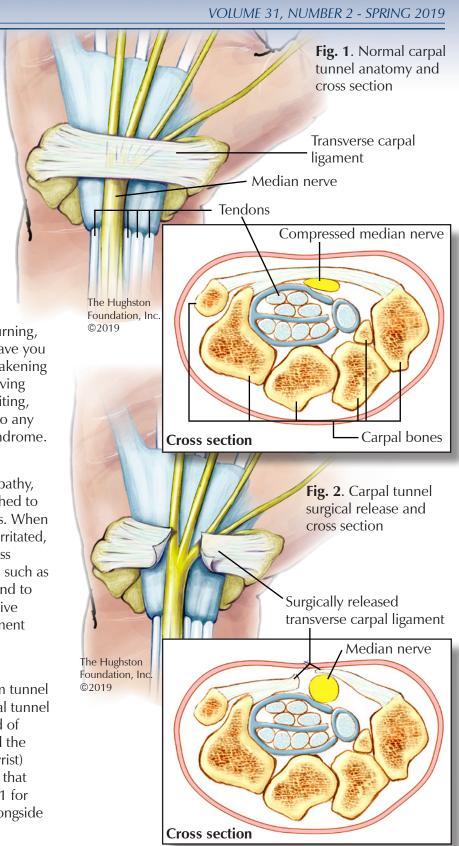
Have you awaken from sleep with numbness, burning, or "pins and needles" sensations in your hands? Have you noticed that your sense of touch or your grip is weakening and that you are dropping items often? Are you having pain or difficulty with fine motors skills, such as writing, fastening buttons, or sewing? If you answered yes to any of these questions, you may have carpal tunnel syndrome.

What is carpal tunnel syndrome?

Carpal tunnel syndrome is an entrapment neuropathy, which means that the nerve is compressed or pinched to the point that it disrupts the normal electrical signals. When the median nerve at the wrist is under pressure and irritated, it creates symptoms of pain, numbness, or weakness usually in the hand and fingers. Common activities, such as talking on the phone, holding a book, or driving tend to bring on the symptoms. Carpal tunnel is a progressive condition, which if left untreated can lead to permanent nerve damage.

Carpal tunnel anatomy

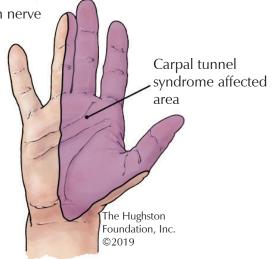
The median nerve passes through a compact, firm tunnel on the palm side of your wrist. The top of the carpal tunnel is formed by the transverse carpal ligament (a band of fibrous connective tissue that connects bones), and the sides and bottom are made up of 8 small carpal (wrist) bones. The carpal tunnel has 9 tendons (soft tissue that connects muscle to bones)—2 for each finger and 1 for the thumb—that pass through the carpal tunnel alongside the median nerve (**Fig.1**).



What are the signs and symptoms?

Repetitive wrist movements involving flexion (bending) and extension (straightening) of either the wrist or fingers may result in inflammation throughout the wrist's architecture. When inflammation or swelling within the carpal tunnel compresses the median nerve, symptoms of paresthesia (tingling, pricking, numbness, burning) or loss of feeling in the first, second, third, and part of the fourth finger occurs (Fig.3). The little finger sensation is usually not affected. The nerve signal to the thumb muscles lessens overtime and dropping items frequently occurs.

Fig. 3. Median nerve supply area



Other symptoms of carpal tunnel syndrome include tingling and pain that radiates up the length of the arm toward the shoulder. During sleep when the elbow or wrist are in a bent position, the hand and wrist pain can awaken you. If your condition is advanced, you can permanently lose strength and feeling in your hand and fingers.

Who is at risk?

Any repetitive movement in the hand and wrist can cause carpal tunnel syndrome and it can be triggered by other medical conditions as well. The risk is not confined to any 1 type of job or industry, although people sometimes relate it to computer usage. Many conditions can cause pressure to build up in the carpal tunnel and impinge the median nerve. For example, people with diabetes who experience neurological symptoms and women who experience fluid buildup during pregnancy are at a higher risk.

The carpal tunnel is relatively smaller in females than in males, which may account for an increased incidence of the condition in women. Sometimes only 1 hand is involved, but both hands are affected in about 50% of patients. Unfortunately, the exact cause of carpal tunnel syndrome cannot be accurately determined in most cases.

When should I seek medical advice?

If you have any type of tingling or loss of sensation in the wrist, hand, or forearm you should seek the attention of

an orthopaedist who specializes in the hand and wrist for diagnosis. Early diagnosis for carpal tunnel syndrome is important to avoid permanent damage to your median nerve.

How is carpal tunnel syndrome diagnosed?

To diagnose carpal tunnel syndrome, your orthopaedist will ask about your symptoms and perform an examination of your hand, wrist, arm, and neck. During the exam, your physician will try to reproduce your symptoms to help diagnose the problem. After taking a detailed health history and performing a physical exam, most physicians can accurately diagnose the condition; however, special testing of the nerve can aid in diagnosis. Electrodiagnostic testing can be performed to determine which nerve(s) are involved, where it is, and the severity. Two specific tests that can be performed to determine whether you are suffering from carpal tunnel syndrome are Tinel's sign (named after French neurologist Jules Tinel, 1879-1952) and Phalen's test (developed by American orthopaedist George S. Phalen, 1911-1998). Both tests put increased pressure on the structures running through the tunnel in order to verify whether or not the pain is produced in these positions. Your orthopaedist can also conduct various tests to rule out differential diagnosis, such as a scaphoid fracture, rheumatoid arthritis, or other inflammatory diseases that can affect your wrist joint.

What are the first steps my doctor will take?

Treatment for carpal tunnel syndrome can be as simple as changing a person's routine or positioning during various activities. Upon initial diagnosis, your physician may suggest a change in posture or limiting time spent in various positions that put pressure on the structures involved. If related to hand use, you may be instructed to take more frequent breaks during repetitive tasks or, if possible, stopping activities that causes the symptoms. Splint use at bedtime is usually the first course of treatment if your symptoms mainly affect you overnight. Nonsteroidal anti-inflammatory drugs (NSAIDs), such as naproxen or ibuprofen, may alleviate pain and symptoms of early carpal tunnel syndrome. However, they have potential side effects with long-term use. If these measures do not prove helpful, surgery may be the answer.

What will the surgery be like?

Carpal tunnel surgery is usually performed as an outpatient procedure. You can often choose to have just local anesthesia or to be put to sleep. The surgery can be done with a traditional open incision on the palm, or a less invasive endoscopic technique. Endoscopy is a newer, less invasive method that uses a special video camera to view inside the hand. With a 1 to 2cm (less than 1/2 inch) incision on the wrist, the endoscope camera enters the carpal tunnel. Under direct visualization, a

small blade on the scope releases the transverse carpal ligament compressing the nerve (Fig. 2). Endoscopy versus an open technique has higher patient satisfaction and recent studies show fewer complications after endoscopic surgery.

Is recovery faster with endoscopic surgery?

With endoscopic surgery, you will only have 1 or 2 stitches on the inside of your wrist compared with 4 to 8 stitches on the palm during traditional open surgery. The endoscopic recovery is faster and you gain function sooner because the traditional incision on the palm is painful, and limits hand use for 3 to 4 weeks. After an endoscopic procedure, you can immediately begin light activities, such as eating or getting dressed the day of surgery, and most patients can drive a car the next day.

What's the long-term prognosis?

In most patients, the tingling and pain of carpal tunnel syndrome usually vanishes quickly after surgery. For more advanced disease, the nerve healing after surgery can take weeks. In the most severe cases, involving permanent nerve damage, complete resolution of symptoms is uncommon. Overall, carpal tunnel release surgery has very high patient satisfaction rate.

How can I prevent carpal tunnel syndrome from ever happening?

Basic prevention for carpal tunnel syndrome requires proper posture and body mechanics; this may include office ergonomics—that is, proper biomechanics for those who sit at a desk and use a computer or less time using motorized tools. When doing work that uses the hands and wrist, you should reduce the force of movements and relax your grip; stretching and taking frequent breaks are also essential. Additionally, it will help if you maintain a healthy weight, exercise, avoid smoking, and control any other medical conditions you may have such as diabetes.

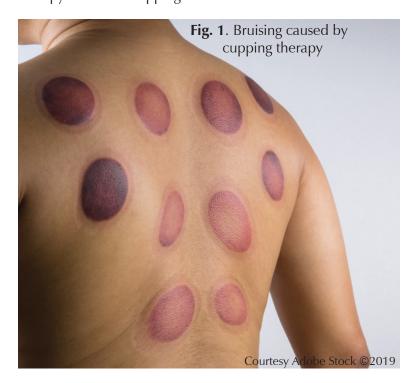
Final recommendations

If left untreated, carpal tunnel syndrome can become disabling. It can cause irreversible damage to the median nerve, which can lead to problems with everyday activities such as picking up objects and holding them. See an orthopaedists before your symptoms become unbearable or nerve damage occurs. If you seek help early enough, you may find relief nonsurgically; however, if you do need surgery, the procedure is effective at relieving your symptoms.

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Cupping Therapy

A few years ago, Michael Phelps—appearing with circular blisters covering his back and shoulders—made Olympic history by claiming his 19th gold medal for swimming. With millions of viewers wanting to know the cause of his bruising (Fig. 1), he helped introduce the world to an ancient Eastern therapy known as cupping.



What is cupping?

A form of alternative medicine, cupping therapy is a treatment technique that originated in Asian and Middle Eastern cultures centuries ago. Although it is one of the oldest methods of healing used in Eastern cultures, it is still new to Western medicine. This therapy has been used to treat trigger points (muscle knots), gastrointestinal (stomach and intestines) disorders, range of motion, general muscular aches and pains, as well as back, shoulder, and leg pain. One of the telltale signs of the modality is the bruising it can leave behind.

How is it performed?

The application of cupping consists of placing the desired number of cups over soft tissue areas creating a suctionlike seal. The first cups used for cupping were made from bull horn; today however, materials such as glass, bamboo, or silicone are used, and they come in different shapes and sizes. The way the suction is applied through the cups depends on the type of cups used. For example, a widelyused type is the vacuum cup that uses a hand-held pump to suck the air out of the cup. Another popular type, the silicone cup, acts as a plunger on the skin to create the pressure. Additionally, fire cupping uses a glass cup and it is administered by placing a match inside the cup and then

placing the cup on the skin (Fig. 2). The heat from the match creates a vacuum seal on the skin. The fire cupping method is more common in Eastern medicine. Typically, practitioners, physical therapists, or physicians place the cups during treatment; however since the kits are available online, some athletes place the cups on themselves or on each other.



How does it work?

The suction causes a negative pressure and raises the skin inside the cup. The suction lasts only for a few minutes, but long enough to cause the capillaries beneath the surface to rupture. The pressure is thought to stimulate the lymphatic (part of the immune system) and cardiovascular (blood circulation) systems, which in turn increases blood circulation and vasodilation (the dilatation of blood vessels, that decreases blood pressure). Practitioners use the therapy to help relieve muscle tension and tightness in a particular area of the body, improve overall blood flow, and to promote cell repair. They also use it to promote the healing of soft tissue and help to eliminate pain.

Why does the treatment bruise the patient?

Cupping is often associated with the skin marks that are left behind after treatment and are part of the ancient theory of why the therapy works. At the treatment area, a visible spot of redness will appear on the skin and on some individual's darker spots that resemble bruises develop. These marks are often referred to as cupping blisters. The blisters are sometimes tender at first, but are not painful or harmful to the patient. The theory is that when injuries occur deep within the body's muscles or soft tissues, bleeding can occur causing a deep bruise and swelling. This bruising and swelling creates a stagnation of blood at the injury site that results in pain, limited range of motion, and if left untreated, more chronic conditions can develop. The seal from the suction of the cup draws the stagnant non-circulating blood toward the surface area of the skin away from the injury site so circulating blood can

flow more easily to the injury. The stagnant blood that was trapped in the layers of the skin is what cause the cupping blisters. The darkness and length of time the blisters are visible is dependent on the amount of pressure applied from the cups and the length of time the cups are used. The blisters typically disappear on their own after a few days or they can last as long as a few weeks.

Types of cupping

There are 2 different categories—wet and dry cupping. Wet cupping is also known as bleeding cupping, which is invasive; therefore, a physician usually performs the therapy. For this method, the physician cups the injured area first, then removes the cup and pricks or makes a small incision to the reddened area, after that he or she reapplies the cup. The pressure draws the stagnant blood to the skin surface and through the incision site. Dry cupping is administered by placing the cup on the designated area, then applying suction. Some practitioners will apply lotion or oils to the skin before applying the cup to reduce skin irritation. This method can also include moving the cup in a single direction while it is applied or adding a pressure point tool inside the cup before applying suction.

Is cupping safe?

You can experience several adverse side effects depending on the type of therapy used, where you place the cups, and how long they stay in place. For example, using heat to draw the air out of a cup can cause burns to the skin. You can also develop long-term bruising or skin infections from wet therapy. Furthermore, applying the cups to the head or skull have been known to cause more serious reactions. Additionally, with a lack of standardization and the ability to purchase a kit online, a patient may overuse or misuse the cups.

Does it work?

Some researchers believe that cupping relieves pain because it has a placebo effect rather than a physiological outcome. Researchers often link a placebo to the mind and body relationship, which means that if a person believes or expects a particular treatment will do something, then the body's own chemistry will cause it to occur. Additionally, although cupping has been used for centuries, there is insufficient standardized research to support conclusions concerning its effective use. Cupping may in fact help reduce pain, but there is not enough good evidence to support why. Before buying cups yourself or seeing a practitioner, talk to your doctor about your symptoms and discuss whether cupping is the right therapy for you and your condition.

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Spondyloarthropathies

Spondyloarthropathies are a group of chronic (long term) inflammatory diseases, often referred to as spondyloarthritis, which damage various joints throughout your body. These diseases include ankylosing spondylitis (AS), psoriatic arthritis, reactive arthritis, and arthritis associated with inflammatory bowel disease (Table). Seen in both children and adults, widespread inflammation classic signs are heat, redness, swelling, pain, and loss of function—often cause low back pain, morning stiffness, and fatigue. Although they have similar symptoms, spondyloarthropathies are different from rheumatoid arthritis in adults and juvenile idiopathic arthritis in children. If you have a form of spondyloarthropathy, depending on the type, it can affect your skin, nails, intestines, heart, spine, and eyes in addition to your joints.

Who is at risk?

Spondyloarthritis often affects males in their teens or 20s and for some patients, it may run in families. Researchers have identified the HLA-B27 gene as a cause for ankylosing spondyloarthritis; however, there are as many as 30 other genes linked to different types of spondyloarthropathies. Not everyone who carries the HLA-B27 gene develops arthritis; still, since there is a genetic link associated with these diseases, family members of affected individuals are at higher risk.

Symptoms

The location of inflammation or concomitant disease (related conditions) is specific to each type of spondyloarthropathy, but all have an overlap of symptoms (see table). For instance, ankylosing spondylitis (AS) will commonly affect the sacroiliac joints (joint between the spine and pelvis) and spine. This type can affect your other joints,

Table. Signs and symptoms of common spondyloarthropathies				
Signs & symptoms	Ankylosing spondylitis	Psoriatic arthritis	Reactive arthritis	Inflammatory bowel disease
Age at onset	Late teen to early adulthood	35 to 45 years of age	Late teen to early adulthood	Any age
Male-to-female prevalence	Male	Equal	Male	Equal
Affected joints	Spine and sacroiliac joint (spine and pelvis)	Any joint	Lower limbs	Lower limbs
Sacroiliitis (inflammatory arthritis of the spine)	Very common	Common	Common	Common
Syndesmophytes (bony growth in a ligament)	Common	Common	Common	Common
Peripheral arthritis (inflammation in large joints)	Occasional	Common	Common	Common
Enthesitis (inflammation where tendons and ligaments attach to bone)	Common	Very common	Very common	Occasional
Dactylitis (inflammation of a finger or toe)	Uncommon	Common	Common	Uncommon
Related conditions	 Chronic uveitis (eye inflammation) Mouth Ulcers Aortic (heart) regurgitation defect Upper lobe (lung) fibrosis 	 Psoriasis skin lesions Nail pitting Chronic uveitis Mouth Ulcers Aortic (heart) regurgitation defect 	 Skin lesions that affect the penis, palms, & soles Nail pitting, detachment of nail from nail bed Chronic uveitis & conjunctivitis (pink eye) Mouth ulcers Aortic (heart) regurgitation defect 	 Inflammation beneath the skin Nail clubbing (tips of finger & toes) Chronic uveitis Mouth Ulcers Aortic (heart) regurgitation defect Inflammation affecting
The Hughston Foundation, Inc. ©2019			Diarrhea	the colon

such as your knees, but the SI joints are specific to AS. Psoriatic arthritis will affect the knees, hips, spine, and classically the hands and fingers. Skin and nail changes will occur alongside the inflammation of joints. Reactive arthritis, also known as Reiter's syndrome, is an inflammatory arthritis often triggered by a bacterial infection. It generally begins several weeks after a urinary and gastrointestinal tract infection. Arthritis associated with inflammatory bowel disease has symptoms similar to the other spondyloarthropathies but is associated with Crohn's disease or ulcerative colitis. Chronic inflammation can occur if the inflammation goes untreated resulting in destructive changes to the joints that then become evident on x-ray. These are only some of the changes as these diseases result in wide-spread inflammation and can involve heart, lungs, kidneys, and the gastrointestinal tract.

Diagnosing spondyloarthropathies

To diagnose the disease, your physician will complete a thorough physical exam and an in-depth health history. Patients diagnosed with one of the spondyloarthropathies will generally have some combination of joint pain and other extra-articular (outside the joint) symptoms ranging from skin changes (psoriatic arthritis), urinary tract infection (reactive arthritis), to bowel complications including diarrhea or constipation (Crohn's disease/ulcerative colitis associated arthritis). Once your physician suspects spondyloarthropathy based on your family history, health history, and physical examination, he or she may order lab testing to confirm the diagnosis.

Treatment

Spondyloarthropathies are diseases of inflammation; therefore, anti-inflammatory medications are the cornerstone of treatment. Medications prescribed generally begin with over-the-counter nonsteroidal anti-inflammatory drugs (NSAIDs), such as aspirin, ibuprofen, and naproxen or your doctor can prescribe a stronger prescription NSAID if needed. If you do not respond to NSAIDs, your doctor can prescribe medications known as disease modifying antirheumatic drugs (DMARDs), such as sulfasalazine (Azulfidine®), methotrexate (Rheumatrex®), etanercept (Enbrel®) or infliximab (Remicade®). These drugs, in one way or another, decrease the inflammation in the body. If the effect of chronic inflammation results in end-stage arthritis, your physician may recommend surgical management for your symptoms. With the advent of the DMARDs, joint destruction and the ill effects of chronic inflammation has lessened the need for early surgical management.

In addition to medications, your doctor will also recommend nonpharmacologic modalities, which can include physical therapy and home exercise and stretching programs. Your physician may recommend that you become more active by taking up a sport, walking, or swimming. You may be encouraged to exercise in water for low-impact activity that is easier on your joints. Additionally, a physical therapist may design an exercise program that strengthens specific muscles around your joints to help with your mobility.

Living with the disease

Living with spondyloarthritis requires treating the symptoms and avoiding triggers that may aggravate the disease. If you have spondyloarthritis, you should exercise regularly to maintain good joint and heart heath. You should not smoke, especially since smoking can intensify symptoms and speed up the rate of spinal fusion in AS patients. If you have spondyloarthritis, with some planning and guidance from your physician, you can manage your symptoms and lead a productive, healthy life.

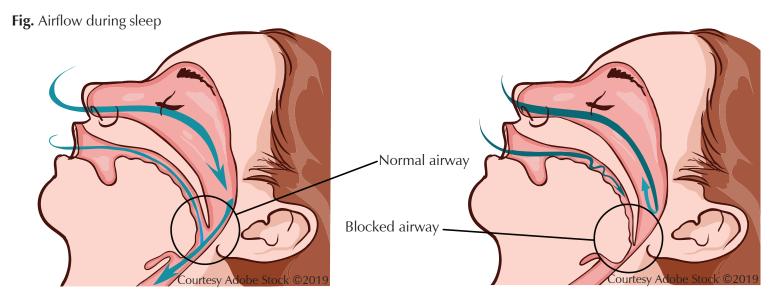
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Sleep Apnea and Athletic Performance

Researchers have long established that sleep has a strong influence on our health and performance during the day. The American Academy of Sleep Medicine and Sleep Research Society reports that the amount of sleep we get on a night-to-night basis has a significant correlation with the risk of life-altering diseases such as diabetes, obesity, stroke, and depression. A variety of studies and members of the American Academy of Sleep Medicine have supported the general recommendation of 7 to 9 hours of sleep per night. Unfortunately, this is not always possible or feasible with a job, school, household upkeep, children, and so on. However, a lack of sleep cannot always be attributed to a busy schedule; many people have a medical condition called sleep apnea (a temporary pause in breathing), which prevents them from getting the amount of restful sleep their bodies require.

What is sleep apnea?

If your airflow is disrupted during sleep, special receptors in the large arteries in your neck sense more carbon dioxide in the blood than usual, causing them to signal the brain to wake you up and send more oxygen to the brain (Fig.). The results are frequent awakenings throughout the night. Your airflow can become blocked or stopped in a number of ways. For example, in obstructive sleep apnea, if you sleep on your back, your tongue or throat tissues can block your airway and with central sleep apnea, your brain fails to send the signal to breathe during sleep. Also complex sleep apnea, sometimes referred to as "mixed" because it has a component of both obstructive and central apnea, can occur. The narrowed airway can cause snoring or choking and gasping sounds or it can result in silent pauses in breathing.



You may be at risk for sleep apnea if you are overweight, have a large neck size, are middle aged, have hypertension (high blood pressure), or have a family history of apnea. Common symptoms include snoring, daytime sleepiness, not feeling rested after a full night of sleep, low energy, and poor concentration.

Does it affect athletic performance?

Insufficient rest can have long-term effects on your health, but it can have more short term, noticeable effects on your performance at work, in the gym, or on the field. A study published in the *Journal of Pediatric Orthopaedics* found that decreased amounts of sleep are associated with increased risk of injury in adolescent athletes. Minimal amounts of sleep restriction have also been associated with decreased endurance, sprint performance, accuracy, reaction time, and function in a variety of sports and activities according to a 2017 study on sleep and athletic performance published in *Current Sports Medicine Reports*.

While lack of sleep has a negative effect on athletic performance; exercise, on the other hand, can have a positive outcome on obstructive sleep apnea. A meta-analysis (a summary of multiple research studies) published in *Lung* in 2014 showed that exercise was effective in reducing the severity of obstructive sleep apnea in patients. Researchers also noted that the improvement was made with minimal changes in body weight; therefore it was not weight loss that triggered the difference. Vigorous exercise also showed to have a significant effect on cardiovascular fineness, daytime sleepiness, and sleep efficiency. This study shows the potential value that exercise can have in the management and treatment of sleep apnea.

Treatment

You should see your doctor if you experience or someone else observes you experiencing any signs or symptoms of sleep apnea; such as, if you have shortness of breath that awakens you, if your breathing pauses, if you have problems staying asleep, or if you are drowsy during the day. After discussing your sleep habits and symptoms, your doctor can help establish whether your lack of sleep is due to sleep apnea or poor sleep hygiene. Good sleep hygiene is a regimen of practices and habits that encourage a restful sleep. If your doctor determines that your symptoms may be more than sleep hygiene, he or she may order a basic laboratory workup which can give clues to a chronic lack of oxygenation due to impaired breathing at night. Your physician can also refer you for a polysomnography study, or sleep study. This involves an overnight stay at a certified sleep center in order to track breathing and sleep patterns. If diagnosed with a type of apnea, your doctor can prescribe a Chronic Positive Airway Pressure machine, or CPAP, which helps keep your airway open during sleep. Other treatments include diet and exercise for weight loss, avoidance of alcohol, and possible surgery in the case of obstructive apnea caused by anatomic obstructions in the throat.

See your doctor

Sleep apnea is a common cause of sleep disturbance that affects anywhere from 15 to 50% of adults in the United States. It can have significant consequences regarding daily performance when at work, and it can substantially diminish our capacity to exercise and keep our bodies and minds healthy. Additionally, researchers have linked it to serious, life-altering diseases, such as diabetes and hypertension. It is therefore imperative to talk to your physician if you are having these symptoms. Appropriate treatment will not only help you find new clarity and improved performance in your work and leisure activities, but may also help prevent other diseases that can drastically shorten your lifespan.

Joseph Kelly, DO Columbus, Georgia





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