



Regional Pain Syndromes

Introduction: At some time in the course of life, virtually everyone will experience pain in a tendon, muscle, or other “soft tissue” location. In this sense, conditions known as *regional pain syndromes (RPSs)* may be the most common rheumatic illnesses known to man. Some of these ailments, however, will be severe enough that they will be brought to the attention of a health care professional.

Technically, RPSs are not arthritis (inflammation of the joint) but usually represent tendinitis (inflammation of the cord-like tendons attaching muscles to bones) or bursitis (inflammation of the pouch-like bursa that provides cushioning to bony surfaces). Most commonly, they arise from *overuse* of the affected part of the body. Consequently, most individuals with these conditions have a good long-term outlook. Less commonly, a RPS may be the sign of another inflammatory arthritic condition, such as *rheumatoid arthritis (RA)*, *ankylosing spondylitis (AS)*, or *psoriatic arthritis (PsA)* or part of the condition known as *fibromyalgia* (see related sections).

Features of RPSs: The main symptoms that prompt a patient with a RPS to seek medical care are pain and loss of function. The pain is usually worse with activity of the affected area but if the injury or inflammation is particularly intense, symptoms may be present at rest. Because of the large number of RPSs that may be observed, we will group them together according to the region of the body affected.

Shoulder: Because the shoulder is the most mobile joint in the body, it is prone to injury and overuse of its many surrounding soft tissues. The group of tendons known as the *rotator cuff* allows for normal shoulder motion but may be injured or inflamed for various reasons. There is also a major bursa in the shoulder that can be a source of pain. Because it is often difficult to differentiate rotator cuff tendinitis from bursitis, these conditions are often lumped together under the heading of *impingement syndrome*, named for the “catching” sensation that occurs with motion of an affected shoulder. When more extensive damage occurs, a partial or complete tear of the rotator cuff may occur.

The biceps tendon, which runs along the front of the upper arm, may also be a source of pain when the attachment site in the front part of the shoulder is irritated. In such patients, the symptoms are more localized to this region. When the structure enclosing the shoulder known as the *joint capsule* becomes inflamed or scarred, severe limitation of motion typically occurs, a condition known as *adhesive capsulitis* or “frozen

shoulder.” This disorder can also occur after injury to the shoulder, as a consequence of a pinched nerve in the neck, or as a complication of diabetes.

Elbow: Muscles that allow for use of the forearm are attached to bony knobs on either side of the elbows known as *epicondyles*. Injury or inflammation to these attachment sites causes localized pain that is aggravated by prolonged use of the hands or wrists, a condition known as *epicondylitis*. When occurring on the outer, or *lateral*, side of the elbow, the common term for this condition is “tennis elbow,” while when occurring on the inner, or *medial*, side of the elbow, many refer to this condition as “golfer’s elbow.” Nonetheless, one does not have to play these sports to experience these conditions.

On the tip of the elbow is a structure known as the *olecranon bursa*. After repetitive pressure or injury to the elbow or sometimes because of an inflammatory disease such as RA or gout, swelling may develop in this area as a result of bursitis. When bacteria invade through the skin, the bursa may become infected, requiring drainage of the fluid and antibiotics.

In the region that most people refer to as the “funny bone,” there is a nerve that is exposed in a small groove on one side of the medial epicondyle. This groove encloses the *ulnar nerve*, which supplies sensation to a portion of the hand and is known as the *cubital tunnel*. Cubital tunnel syndrome is caused by pressure to this nerve by either prolonged resting of the elbow on a hard surface or inflammation of the elbow joint, which reduces the space available to the nerve. Numbness or pain of the 4th and 5th fingers is the most common symptom.

Hand and Wrist: Just as the elbow has the cubital tunnel, the wrist has the *carpal tunnel*, located on the palm side of the wrist, enclosed by a fibrous band, and containing many tendons, arteries, and nerves. When pressure increases inside this region, pressure is placed on the *median nerve*, resulting in the common condition known as *carpal tunnel syndrome*. Patients with this ailment typically report pain, numbness, and/or weakness of the hand and wrist, particularly in the thumb through middle finger. Job-related overuse is a common cause, but not the only contributor to the development of carpal tunnel syndrome. Inflammatory conditions such as RA, hormonal conditions such as thyroid disease, and pregnancy are among the many illnesses that can lead to this condition.

A *ganglion cyst* is an area of localized swelling that most commonly occurs on the back of the hand or wrist. This cyst is often a consequence of prolonged use and form as the lining around the joint or tendon fills up with fluid. The ganglion cyst may not be painful, and many patients tolerate this lesion very well. Only if the cyst enlarges quickly is it typically associated with pain.

Because there are many tendons leading into the hand, acting as “pulleys” on the fingers, there are many forms of tendinitis that can affect the hand or wrist. When pain and/or swelling occur at tendons at the base of the thumb, this condition is known as *DeQuervain’s tenosynovitis*. Swelling of the tendons on the palm side of the hand may

produce a painful locking or snapping sensation when the finger is flexed, known as *stenosing tenosynovitis* or “*trigger finger*.” Inflammatory diseases as well as prolonged pressure to the hand (use of a cane, for example) may all precipitate this condition. More extensive thickening of the soft tissues on the hands may produce incomplete opening of the hand, a condition known as *Dupuytren’s contracture*, often found in the setting of diabetes or alcoholism but also occurring without a known cause in some patients.

Hip: The hip joint is located deep in the groin, and patients with true hip joint disease usually experience pain in this region. Bursitis of this region is more often the cause of what patients experience as hip pain. There are three sets of bursa in the hip: the *trochanteric bursa* on the outside of the hip and thigh, the *ischial bursa* on the buttock, and the *iliopsoas bursa* in the groin.

Trochanteric bursitis is often caused by tightness a muscle along the side of the buttock and thigh, which is connected to a tendon known as the *iliotibial band*. This irritates the bursa and often leads to a “snapping” sensation along the side of the hip. Ischial bursitis is commonly experienced on the buttock and is aggravated by sitting on hard surfaces. Iliopsoas bursitis can easily be confused with hip joint disease due to its location in the groin but is associated with normal hip range of motion.

Another condition causing pain in the front portion of the thigh caused by compression of the *lateral femoral cutaneous nerve* is termed *meralgia paresthetica*. Patients with this problem often feel a burning or tingling sensation in the region supplied by the nerve. Tight fitting clothing may contribute to the development of meralgia paresthetica, but a cause cannot be clearly found in many affected individuals. Thankfully, this disorder is often short-lived.

Knee: The knee is a common joint to become involved in a number of forms of arthritis, but the soft tissues around the knee may also be sources of pain. A major cause of symptoms in some individuals is due to injury or inflammation of a bursa on the inner area below the knee, known as *anserine bursitis*. This region may be swollen, and patients often report that they must sleep with a pillow between their legs at night to avoid placing pressure on the inflamed structure. When the swelling and pain occur over the kneecap, this disorder is known as *prepatellar bursitis*, which is often caused by prolonged kneeling or inflammatory diseases such as gout.

In the back of the knee, some of the lining of the joint or hamstring tendons may produce an area of swelling known as a *Baker’s cyst*. This condition often arises from underlying osteoarthritis or RA affecting the knee and may or may not be associated with pain. This cyst, however, can rupture and cause swelling and pain in the calf in a minority of patients.

Foot and Ankle: As is seen in the hand and wrist region, there are a number of tendons that can become injured or inflamed in the area of the foot and ankle. Tendinitis may affect the *posterior tibial tendon*, located above the instep on the inside of the ankle, the *Achilles tendon*, located in the back of the heel, or a number of tendons on the top of the foot and ankle region. Individuals wearing shoes that apply pressure to the heel may

develop pain and swelling in the heel known as *retrocalcaneal bursitis*, or “*pump bumps*.” There is also a fibrous layer of tissue on the bottom of the foot that attaches to the bottom of the heel that may become irritated or inflamed, leading to a common condition known as *plantar fasciitis*. Patients with this disorder often feel their most intense pain in this region when first stepping out of bed in the morning or after a prolonged period of rest. RPSs of the foot and ankle region are often due to strain and overuse, but both AS and PsA must be considered when these problems are encountered, as they are common manifestations of these forms of arthritis.

A nerve supplying the first two toes and sole known as the *medial plantar nerve* may be compressed by swelling or irritation of the overlying tissues. The result is numbness and/or burning pain along the area this nerve supplies. This is known as *tarsal tunnel syndrome*, analogous to carpal tunnel syndrome of the hand and wrist region. Those with flatfoot deformities abnormal angulation of the ankle, or an inflammatory disease in this region are prone to developing this problem.

In the ball of the foot, between the “web spaces” of the toes are nerves that supply sensation to each toe. When the bones are pushed together, these nerves can become irritated and develop an area of swelling known as a *Morton’s neuroma*. Patients with this problem often experience a burning pain in the toes, at times accompanied by numbness. Choices in footwear often play a major role in the development of this condition, and women wearing high heels or other tight-fitting shoes typically are at greatest risk for developing a Morton’s neuroma.

Back and Neck: While osteoarthritis often contributes to lower back and neck pain, perhaps the most common reason for these problems is strain to the soft tissues around the vertebrae. These problems may be a result of repetitive strain or one-time injury but don’t always have a clear-cut cause. Occasionally, a knotted up muscle, known as a “*trigger point*” may be observed. A more specific condition that occurs in the lower back and buttock is *piriformis syndrome*. Patients with this disorder have localized pain on one side or the other that may radiate down the leg and mimic *sciatica*. It is caused by a muscle that becomes tight and painful and which may place pressure on the sciatic nerve. At the base of the neck near the midline, swelling and pain can occur in a process known as *interspinous bursitis*. In most patients with lower back or neck pain, however, it is difficult to pinpoint a specific region responsible for the symptoms even in the hands of the most skilled physician.

Chest: Any type of chest pain can be alarming, given the high prevalence of heart disease in the United States. In many patients, however, the chest wall itself is the cause of the pain. The muscles of the chest wall may become strained or injured, but another condition may occur affecting the cartilage joining the ribs to the sternum (breastbone) known as *costochondritis*. These patients are often tender over a well-localized area on the chest and less commonly may exhibit swelling over this region, which is sometimes referred to as “*Tietze’s syndrome*.”

Diagnosis: Most RPSs can be diagnosed by a careful review of the symptoms and an examination by the health care professional. The location of the pain and the

activities that aggravate symptoms will typically suggest one of the above conditions. When the practitioner examines a patient, he/she will be able to elicit pain in the affected area with pressure, motion, or a number of maneuvers that the patient is asked to perform.

Laboratory testing is not necessary for the vast majority of RPSs unless a concurrent inflammatory rheumatic disease such as RA is suspected. Similarly, x-ray studies are not needed in the vast majority of patients, and if the problem is only in the soft tissues, plain x-rays will not be able to image these areas. If the RPS is a part of a disease such as AS or PsA, an area of “reactive bone” will occasionally be seen where the tendon or ligament inserts. Magnetic resonance imaging (MRI) is useful to diagnose complications such as tears or ruptures in the tendons (a rotator cuff tear of the shoulder, for example) and in selected cases to rule out other diagnoses but does not have a role in the routine diagnosis of RPSs.

Therapy: Treating RPSs involves a combination of medical therapy, stretching and strengthening exercises, splinting or bracing, injections, or in a few situations surgical treatment.

Non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen (Motrin) and naproxen (Naprosyn) are often effective at relieving the symptoms of RPSs. When used short-term (a few weeks or less), these medications are generally quite, but more long-term use can be associated with damage to the lining of the stomach, uncommonly progressing to bleeding ulcers, and reduced kidney function. *Analgesics* such as acetaminophen (Tylenol), tramadol (Ultram), or propoxyphene (Darvon, Darvocet) may also reduce symptoms but lack the anti-inflammatory effect of NSAIDs and treat the problem less directly.

Exercises that promote stretching and/or strengthening of the involved region are the mainstay of therapy in most RPSs and reduce the tension of inflamed tendons or muscles. While results are not immediate, the benefit eventually achieved will typically be more durable. In fact, the vast majority of patients who do not feel exercises helped their RPS never truly performed the exercises consistently or for a sufficient period of time. In certain situations, the help of a physical or occupational therapist may be useful to help supervise an exercise program.

Splints or braces over an inflamed or painful tendon or other soft tissue structure helps rest this region and allow it to heal. Some splints may be difficult to wear during certain activities during the day but can be valuable in protecting painful muscles or tendons from overuse. These devices are less useful in the larger joints such as the shoulder or hip but are quite helpful in treating RPSs of the hand, wrist, foot, and ankle in particular. Some of these items can be purchased over the counter at the pharmacy, but many patients achieve better results with a custom-made splint fashioned by a therapist.

Injections of corticosteroids, with or without local anesthetic, typically provide rapid relief of symptoms for patients with a number of RPSs, and results may be long-lasting. The risk of infection and other complications is quite low, and while many areas are painful to inject, when performed by a skilled practitioner the pain of the procedure is

brief and can be minimized. Most patients report more pain from their underlying condition than from the injection itself. These injections can be repeated, but to avoid excessive scarring in the soft tissues the interval between procedures in the same region should be no less than about three months. When a number of successive injections are required to relieve symptoms, other treatment options should be considered.

Surgery has a role only in a minority of patients with RPSs. Rotator cuff tears and other permanent injuries may be appropriately referred to a surgeon, and carpal tunnel syndrome, tendinitis of the hand/wrist, plantar fasciitis, and other conditions listed above may also require surgery if standard therapies listed above are without benefit. The decision on when to pursue such procedures requires a good deal of discretion on the part of the surgeon and referring practitioner, but the patient is ultimately the one who must make this decision based on the degree to which the RPS is interfering with daily activities.

A combination of these therapies usually results in satisfactory outcomes for the majority of patients with RPSs. Using these tools, the primary care physician, occasionally in conjunction with the specialist and physical or occupational therapist working together with the patient's preferences will typically yield favorable results over time.