ARTHROSIS OF THE BASE OF THE THUMB

Arthrosis is the name given to any condition that irritates or destroys a joint. It is a frequent condition in the thumb that occurs most often in women over 40 years of age. Arthritis of the base of the thumb is commonly associated with osteoarthritis, although rheumatoid arthritis and trauma may predispose this condition. In a normal joint, cartilage covers both ends of the bones and allows them to move smoothly and painlessly against each other. With osteoarthritis (also called degenerative arthritis), the cartilage wears out and the bones grind against each other. As the cartilage layer continues to wear, symptoms of arthritis develop and the joint is eventually destroyed. Trauma-related arthritis occurs when the joint is injured, either by fracture, dislocation or damage to the ligaments surrounding a joint causing instability or damage to the joint surfaces.

SIGNS AND SYMPTOMS

The onset of arthritis of the base of the thumb is usually gradual, with discomfort present for many years before the patient seeks treatment. The first symptom noticed is often pain associated with activities that involve gripping an object with the thumb and fingers, e.g. opening jars, opening car doors, and turning keys in locks. Changes in the weather may also cause an increase in pain. Weakness and clumsiness are also frequently noted. Pinching strength decreases and swelling may develop when using the thumb. Swelling at the base of the thumb and tenderness to palpation usually occur.

DIAGNOSIS

History of signs and symptoms, use of the hands and any prior injuries is necessary. A diagnostic maneuver known as the 'grind test' or 'torque test' may distinguish basilar joint arthritis from other injuries. During this test the thumb is grasped and downward pressure is applied, the joint is alternately distracted, compressed and rotated. Pain and crepitus are indicative of the condition. With time, movement of the thumb becomes more difficult, especially when moving the thumb away from the other digits. X-rays may be necessary to confirm the diagnosis and to check for underlying fractures.

TREATMENT

Cases of arthritis of the base of the thumb that are discovered early usually respond to limiting movement, using a custom splint and anti-inflammatories. Most patients can return to all activities with a modified soft neoprene splint. More severe cases may require surgery.

Surgery when indicated, removes the trapezium and a strip of tendon is used to recreate a new joint space.

Post-operatively, the hand is immobilized in a bulky dressing with a rigid splint to support the thumb. The fingers and tip of the thumb are usually left free to permit early range of motion. Elevation of the hand and movement of the fingers is important to help prevent swelling. The dressing is changed and sutures removed at 10-14 days post-operatively. A thumb spica cast is then applied for an additional 3-4 weeks of immobilization. At about 6 weeks after surgery, therapy is initiated with a hand therapist. A small splint may be made to protect the thumb between exercises and to maintain the web space between the thumb and index finger. Unrestricted use of the thumb is usually permitted 12 weeks after surgery. It may take up to one year post-op before the maximum benefits of surgery are achieved.

Osteoarthritis of the carpometacarpal joint of the thumb

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Arthritis of the joint at the base of the thumb is a frequent condition that occurs most often in middle-aged women. It is commonly associated with osteoarthritis, although rheumatoid arthritis and trauma to the articular surfaces of the joint also may predispose the condition.

Anatomy and pathology

The carpometacarpal joint of the thumb has a unique saddle-shaped configuration (*Figure 1*) that allows the thumb to rotate in a wide motion arc from a flat plane of extension-abduction to a position of functional preparedness directly opposing but well-separated from the other digits. It then may be rotated further to touch the tip or base of any of the four digits. Stability of this important joint depends on several small ligaments that tighten during opposition and power pinch to prevent the articular surfaces from separating as they twist on themselves.[2] In this position, forces are unevenly distributed over the joint surfaces, and wear will inevitably occur with time.

Ligamentous injury also may contribute to the development of carpometacarpal arthritis by allowing the joint to become hypermobile. The strong demands that are placed on the joint during everyday use will, in time, result in a painful synovitis and an accelerated articular attrition.[1]

Subluxation of the joint is followed by the characteristic features of osteoarthritis: narrowing of the joint space, sclerosis of bone and the development of cysts and osteophytes. The condition may progress until there is wide separation between the bases of the first and second metacarpals, and the base of the first metacarpal may become subluxed off its trapezial seat. In advanced disease there may be complete destruction of the trapezio-metacarpal joint with collapse of the trapezium, adduction of the first metacarpal and arthritic deterioration on all sides of the trapezium.

Incidence

Women are more commonly affected than men, and symptoms occur most often in the fifth decade. The dominant hand is somewhat more affected than the nondominant hand, and bilateral involvement occurs in at least 25% of the cases.

Clinical characteristics

Arthritis of the carpometacarpal joint of the thumb is usually characterized by an insidious onset, often with discomfort present for many years before the patient seeks treatment. Pain at the base of the thumb during activities that longitudinally load the first ray are the most common complaints and may be associated with weakness and clumsiness. Difficulty opening jar lids and automobile doors are frequently reported. There also may be a tendency to drop objects.

Patients often will develop alternative methods of completing tasks that produce thumb pain, and a disuse atrophy of the thenar musculature may result. In advanced cases, the patient may experience aching of the base of the thumb when it is not being used. Nocturnal symptoms may be confused with carpal tunnel syndrome.

Diagnostic features

Swelling at the base of the thumb due to synovitis and inflammation of the pericapsular structures usually is present, and lateral subluxation of the first metacarpal results in a firm prominence at the level of the joint. Tenderness to palpation is well-localized over the palmar, lateral and dorsal

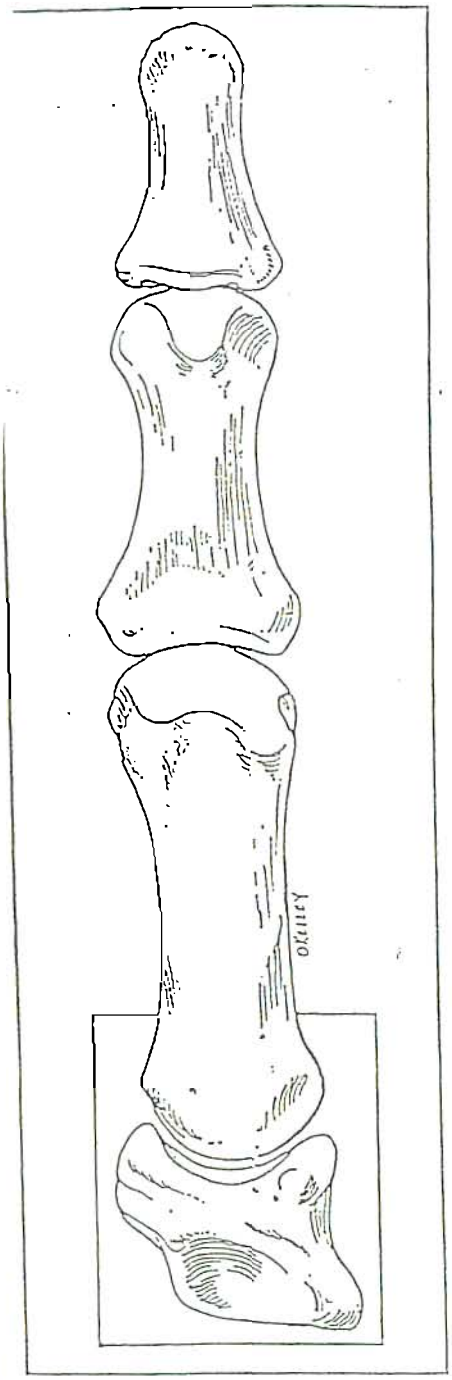

Figure 1: Saddle-shaped contour of the normal carpometacarpal joint.

margins of the joint. A diagnostic maneuver know as the "grind test" or "torque test" may distinguish carpometacarpal joint arthritis from other disorders (*Figure* 2).

During this test, the first metacarpal is grasped just proximal to the metacarpophalangeal joint and downward pressure is exerted. The carpometacarpal joint is alternately distracted, compressed and rotated. Pain and crepitus are pathognomonic of the disorder.

Instability can be confirmed by applying pressure to the base of the thumb and asking the patient to pinch strongly. Lateral subluxation and crepitus may be detected by this test. In later stages, first metacarpal abduction and extension become progressively limited, and pinch and grip strength measurements are reduced. Atrophy of the thenar muscles secondary to disuse also may be seen in advanced arthritis of this joint.

While the carpometacarpal joint of the thumb may be seen on standard anteroposterior x-ray views, the hyperpronated or Robert view provides the best view of the joint. This view is taken with the arm fully pronated, the shoulder internally rotated and the thumb abducted. Radiographic changes have been divided into four stages (*Figure* 3): stage I - widening of the joint space; less than one-third subluxation and normal articular contours; stage II - one-third subluxation, irregularity or calcific deposits (less than 2 mL) of the joint margins and early erosion of the trapezium; stage III - more than one-third subluxation, larger calcific deposits (greater than 2 mL) or osteophytes and joint space narrowing; and stage IV - advanced changes including major subluxation, cystic and sclerotic bone deterioration, narrowing and destruction of the joint surfaces and large osteophyte formation.

Involvement of the other joints around the trapezium often is seen. The first metacarpal may become markedly adducted, resulting in a secondary hyperextension of the metacarpophalangeal joint.

Treatment

In the early stages of carpometacarpal arthritis, anti-inflammatory medication, intra-articular steroid injection or simple splinting designed to abduct the first metacarpal and limit motion may be helpful. Many patients will obtain some transient

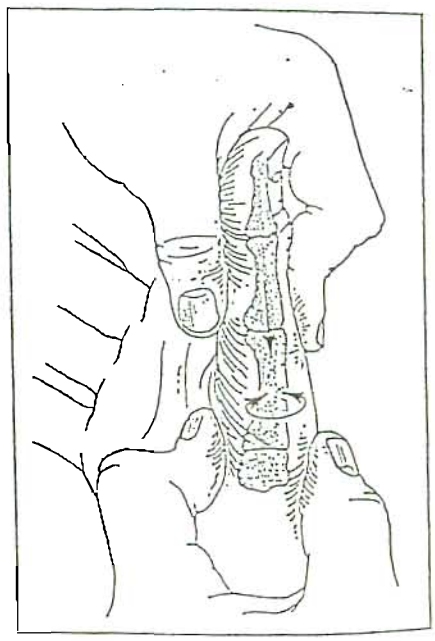

Figure 2: The "grind" or "torque" test for carpometacarpal joint arthritis. Compression, distraction and rotation of the first metacarpal will produce pain and crepitus at the joint.

relief from these measures, but surgery may be necessary when symptoms persist or recur, altering the patients' ability to perform daily tasks. Surgical options include carpometacarpal joint fusion or various excisional, interpositional or suspension arthroplasty procedures designed to relieve pain while preserving motion and stability in this important joint. ❑

This is another in a series of monthly articles on hand conditions from the Indiana Center for Hand Surgery and Rehabilitation of the Hand and Upper Extremity in Indianapolis.

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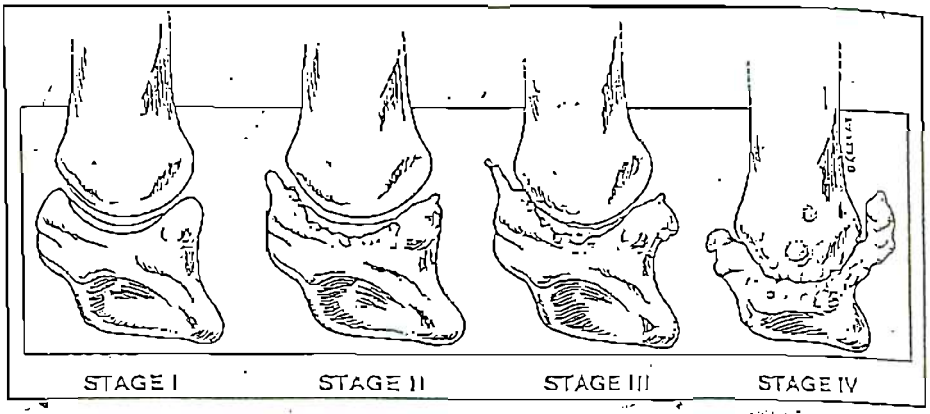

Figure 3: X-ray stages of carpometacarpal disease.

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prevent undesired swelling. The postoperative dressing will be changed and sutures removed at 10 to 14 days after surgery. A thumb spica splint or cast will next be applied for an additional 3 to 4 weeks of immobilization. Approximately 6 weeks following surgery, a therapy program is initiated for restoring motion in the thumb. The fixation pin, if not previously removed, is removed at this time. A small splint is made to protect the thumb between exercises and to maintain the web space between the thumb and index finger. A therapist will provide a specific exercise program as well as advice on what activities should and should not be done. Discomfort with the early therapy is not uncommon and improves with time. If necessary, appointments will be made with the Hand Rehabilitation Center for periodic checks on the progress of therapy. Unrestricted use of the thumb is usually permissable at 12 weeks postop. Up to one year may be required before the maximum benefits of surgery are achieved.

ARTHRITIS OF THE BASILAR JOINT OF THE THUMB

This booklet has been prepared by the staff of The Indiana Center for Surgery and Rehabilitation of the Hand and Upper Extremity to help our patients better understand Arthritis of the Basilar Joint of the Thumb.

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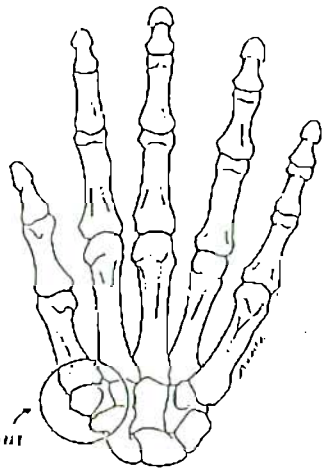
ARTHRITIS OF THE BASILAR JOINT OF THE THUMB

Any condition that irritates or destroys a joint is referred to as arthritis. Of the over 100 types of arthritis that afflict the human body, by far, the most common is osteoarthritis; or, as it is sometimes known, degenerative joint disease. In a normal joint, cartilage covers the ends of articulating bones and permits their smooth, painless movement against one another. In osteoarthritis, the cartilage layer wears out permitting bone to make contact against bone. As this process proceeds to destroy the joint, the signs and symptoms of arthritis develop. In the hand, the second most common joint to develop osteoarthritis is the joint at the base of the thumb.



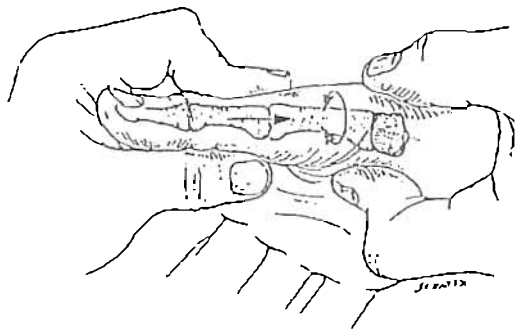
The basilar or first carpometacarpal joint of the thumb is formed by a small carpal or wrist bone called the trapezium and the thumb metacarpal. The unique shape of their surfaces permits the thumb to move in and out of the plane of the palm as well as being able to reach across the palm or oppose to the other fingers. Arthritis involving the basilar joint of the thumb is far more common in women than men. It typically presents after age 40. A prior history of fracture or other injury about the joint may increase the likelihood of developing

SIGNS AND SYMPTOMS

The earliest symptom of basilar joint arthritis is pain with activities that involve pinch. These include opening jars, door knobs, car doors, and turning keys. Prolonged or heavy use of the thumb may produce an aching discomfort at the base of the thumb. Changes in the weather may produce similar symptoms. As the disease processes, less stress is required to produce the pain. Pinch strength diminishes. Activity related swelling may develop. Later any motion of the thumb, even without stress, becomes painful. Eventually the basilar joint begins to appear enlarged and out of place. This is usually accompanied by limitation in thumb motion.

DIAGNOSIS

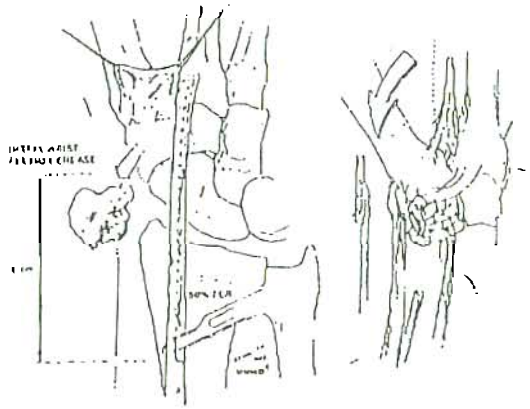
A careful history will frequently alert the physician to suspect basilar joint arthritis. Inspection of the thumb will sometimes reveal a lump or prominence at the base of the thumb that represents either inflammation of the joint or displacement of the thumb metacarpal. Palpation about the joint may detect tenderness. Pressing the thumb metacarpal firmly against the trapezium and moving the joint (grind test) will usually reproduce the symptoms of pain and may produce a gritty sensation called crepitance. This represents bone contact against bone.



Early on, motion of the thumb is normal. Later, however, motion becomes impaired with particular difficulty extending the basilar joint. In severe cases, the thumb metacarpal collapses into the palm and compensatory hyperextension deformity develops at the metacarpophalangeal joint to permit grasping

TREATMENT

Initially the symptoms of basilar joint arthritis will respond to limited activities and rest. When this fails, use of an anti-inflammatory and protective splinting may be of benefit. Additional relief of symptoms can sometimes be achieved by a cortisone injection of the joint. When conservative methods of treatment no longer provide benefit, surgical intervention may be warranted. The goal of operative management is to relieve pain and preserve motion in the thumb. This is accomplished by removing the destroyed joint and creating a substitute joint called an arthroplasty.



The bone at the base of the thumb (trapezium) is first removed and a "sling" of tendon is inserted into the space.

Presently two types of procedures are used to reconstruct the joint. Both involve removing all or part of the trapezium and replacing it with either an artificial substance such as silicone rubber or a strip of tendon to create a new joint space. This procedure can be performed as an outpatient and requires either an axillary block or general anesthetic. A small stainless steel pin may be used to temporarily stabilize the reconstructed joint.

Following surgery, the hand is immobilized in a bulky compressive dressing with a rigid splint to protect the thumb. The fingers are usually left free to permit early motion. Motion may be permitted at the end joint of the thumb. Elevation of the hand and [illegible] of the fingers is extremely important to

What is it? Any condition that irritates or destroys a joint is called arthritis. In a normal joint, cartilage covers the ends of the bones and allows them to move smoothly and painlessly against one another. With osteoarthritis (also called degenerative arthritis), the cartilage layer wears out and the bones rub against each other. As the cartilage layer continues to wear out, symptoms of arthritis develop and the joint is eventually destroyed.

In the hand, the second most common joint to develop osteoarthritis is the joint at the base of the thumb, or basilar joint. The basilar joint of the thumb is formed by a small wrist bone and the first bone of the three bones in the thumb (see Diagram 1). The shape of these bones gives the thumb a wide range of movement–up and down, across the palm, and the ability to pinch with each finger.

Who gets it? Arthritis in the basilar joint of the thumb is more common in women than in men. It usually starts after age 40. Past injuries to this joint–fractures, sprains, etc.–may increase the chances of developing this type of arthritis.

Signs and symptoms. The first symptom of basilar joint arthritis is pain with activities that involve gripping an object with the thumb and fingers (pinching). These activities could include opening jars, turning door knobs, opening car doors, and turning keys. Heavy use of the thumb also may cause pain in the basilar joint, as can changes in weather–like a change in humidity or temperature. As the disease worsens, less activity is needed to produce pain. Pinching strength decreases and swelling may develop when using the thumb. As the arthritis continues to worsen, the basilar joint begins to look bigger and out-of-joint. At this point, movement of the thumb becomes limited.

Diagram 4
Diagram for doctor's use.

Diagnosis. A detailed history on how the hands have been used and any prior injuries to the thumb will give reasons for the doctor th think that basilar joint arthritis could be present. Close inspection sometimes will reveal a lump at the base of the thumb that can be swelling in the joint or displacement of the thumb's first bone. Pain may be felt when pressing around the area of the joint. Also, forcing the first thumb firmly against the wrist bone while moving the joint will usually produce pain and may produce a gritty feeling. The pain and gritty feeling means that the bones are rubbing against each other (see Diagram 2). Early on, movement of the thumb is normal. Later, movement becomes more difficult, especially when sticking the thumb out to the side. In worse cases, as the joint wears away, the thumb's first bone collapses into the palm when gripping smaller objects. The collapse of the first bone then causes the second joint to overextend when gripping larger objects (see Diagram 3).

Treatment. Cases of basilar joint arthritis that are discovered early will usually respond to non-surgical treatment–limiting movement of the thumb, placing a splint on the thumb, and using medicine to prevent swelling. More severe cases may require surgery. Your doctor can advise you on the best treatment for your situation.