

Thumb basal joint arthritis

Arthritis, or more specifically osteoarthritis, of the base of the thumb can be one of the most debilitating places for this to occur. Osteoarthritis refers to the wearing of the cartilage down to bone within the joint with pain, grinding or crunching and possible loss of motion within the joint. On x rays we may see narrowing of the joint space, bone spurring, bone cysts, or malalignment of the joint.

The base of the thumb is the second most common place for this to occur in the hand. It is more common in women, and usually becomes more symptomatic in the 5th to 6th decade. Specifically in the base of the thumb, osteoarthritis can lead to pain, swelling, prominence on the radial side of the palm (known as the shoulder sign), and possible grinding or crunching with motion of the thumb or gripping. The pain can be significant enough over time to cause disuse, which leads to atrophy of the muscles that support the base of the thumb on the palm.

The base of the thumb has a difficult job because it must support the pinch force of all the other digits, and it is done on a somewhat unstable bony base that is more suited for mobility than absolute stability. The near or proximal base of the metacarpal of the thumb is shaped like a saddle that is sitting on another saddle of the trapezium, one of the carpal bones of the hand. This arrangement allows for great range of motion in multiple directions, but requires good ligamentous (direct bone to bone soft tissue attachment) and muscular support to function well. Important in this situation as well is the way that forces get magnified within the joints of the thumb with loading or use. This magnification is common within other joints in the body, and in the thumb, seemingly small loads of the hand can lead to wear because of considerable increases. When pinching with 2.2 lb (1 kg) of force at the tip of the thumb against another finger, it can be almost 30 lbs (13.4 kg) of force within the joint at the base of the thumb.

In the 1970s to 1980s several key studies were conducted in human cadavers to determine why and how arthritis in the thumb occurs. Studies of cadavers who had arthritis of the thumb showed particular patterns of wear within the joint, and due to the different stages noted, differences in laxity or looseness were noted. From that basis, detailed sectioning studies (where single ligaments were cut and then testing performed) allowed us to focus on two ligaments that hold together the thumb basal joint, otherwise known as the CMC or carpo-metacarpal joint. They are the palmar oblique or beak ligament and the dorsoradial ligament. Then looking again at the worn joints in both cadavers and patients with arthritis confirmed a clear connection between laxity and wear within the thumb CMC joint.

There are several methods for treating osteoarthritis of the thumb. A combination of severity of symptoms and appearance on x ray determines the treatment plan, as decided upon by patient and surgeon.

A mainstay of treatment regardless of severity of disease is splinting and nonsteroidal (NSAID) anti-inflammatories by mouth. The splint is based on the palm and is otherwise known as a short opponens splint, usually custom-made by an occupational therapist.

If this fails and there is significant degeneration noted on x ray, then this can be supplemented by corticosteroid injection. This assists in decreasing inflammation and pain within the joint. Corticosteroid injections are usually administered no more than 4 times per year, although it may be effective for many months at a time.

If these methods fail, then surgery becomes an important option. The first surgeries in the 1940s consisted of simple trapeziectomy as promoted by Gervis, and had reasonable success. This surgery is still performed and a pin is placed to allow for stabilization of the joint while a scar tissue could form in the space from the blood collection, and from this the surgery is known as a “hematoma distraction arthroplasty”.

With knowledge of the importance of ligament stabilization, further interest was placed in reconstructing the lax ligaments about the thumb CMC, primarily the volar beak otherwise known as the deep anterior oblique ligament. Eaton and Littler proposed a reconstruction using one of the wrist flexors routed through holes in the base of the first metacarpal with interposition of the end of folded tendon within the defect left by the resected trapezium. It is known as a LRTI for Ligament Reconstruction and Tendon Interposition. It has proven excellent in function and has good long-term durability.

Two further special cases remain. The first is the development of instability and pain prior to radiographic changes in the CMC joint. Two reconstructive options exist for this, first with a similar approach to LRTI, without resection of the trapezium. The second corrects the joint loading by cutting and realigning the 1st metacarpal to redistribute the joint forces more symmetrically. Both have proven to have good outcome but the ligament reconstruction has longer term follow up.

The second important case is significant arthritis within a young, heavy demand patient. In this situation carpometacarpal fusion is recommended. It limits motion but is superior in terms of durability for the remainder of the patient, with no pain after healing of the fusion.

Overall, thumb CMC arthritis can be a disabling if untreated, but with judicious use of a wide variety of treatment options, many patients can return to excellent function.

Reference:

Tomaino M, King J, Leit M. Chapter 12, Thumb Basal Joint Arthritis. In Green's Operative Hand Surgery, 5th Ed. DP Green MD, RN Hotchkiss MD, WC Pederson MD, SW Wolfe MD. Elsevier Churchill Livingstone. 2005: Philadelphia.