Radiological studies of arthritis of the carpo-metacarpal joint of the thumb

N G J Maritz
MMed Orth, FCS Orth

Department of Orthopaedic Surgery
University of Pretoria

Abstract

Osteoarthritis of the trapezio metacarpal joint of the thumb is a common problem. Good X-ray studies will help to demonstrate the problem better and therefore the correct treatment can be applied.

Osteoarthritis of the trapezio metacarpal joint is a common problem in middle-aged women, with a reported prevalence of 33% in postmenopausal women.[1] The clinical diagnosis is usually not difficult, with pain as the main symptom during power grip. The grinding test, where axial pressure is exerted on the joint and rotational movement is performed at the same time will reproduce the pain. However, the staging of the arthritis is done by X-rays and treatment is planned accordingly. Therefore one needs accurate X-rays.

Radiographic assessment

Standard radiographic evaluation of the trapezio metacarpal joint should include the following:

1. Antero-posterior (AP) and lateral (Fig. 1).

Fig. 1. AP X-rays of a patient with CMC pain. The (L) side shows signs of arthritis with one-third subluxation. The (R) side shows less than one-third subluxation.

2. Dynamic stress views. The dynamic stress view is an AP view with the radial borders of the distal phalanx of the thumb pressed together. This view is useful to demonstrate ligamentous laxity with subluxation of the joint (Fig. 2).[2]

3. The Robert pronated AP view.[3,4] This AP view is taken with the dorsal surface of the thumb metacarpal positioned on the X-ray plate by hyperpronation of the forearm and internal rotation of the shoulder. This projection provides excellent views of all four trapezial facets and demonstrates arthritic changes very well (Fig. 3).

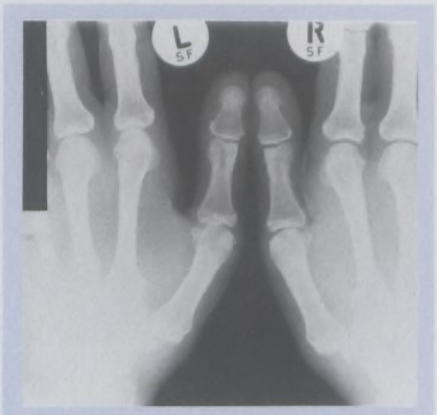

Fig. 2. Stress views of the same patient show the subluxation more clearly and will change the classification and the treatment of the patient.

Fig. 3. This is the Robert's views of the same patient. Now one can see the arthritic changes very clearly, even on the (L) side, which looked almost normal on the ordinary AP views.

According to Eaton and Littler[2] four stages of carpometacarpal (CMC) arthrosis are recognised roentgenographically:

Stage I: In the synovitis phase, before significant capsular laxity has developed, the roentgenogram may show slight widening of the joint space (joint capsule distension due to

effusion), normal articular contours, and less than one-third subluxation in any projection.

Stage II: Significant capsular laxity is now present. There may be at least one-third subluxation of the joint. The instability is particularly apparent on stress roentgenograms. Small bone or calcific fragments less than 2 mm in diameter are present, usually adjacent to the volar or dorsal facets of the trapezium.

Stage III: Greater than one-third subluxation is present. Fragments greater than 2 mm are present dorsally or volarly, usually in both locations. There is slight joint-space narrowing.

Stage IV: Advanced degenerative changes are now present. Major subluxation is apparent, and the joint space is very narrow, with cystic and sclerotic subchondral bone changes.

Dell *et al.*[5] renewed their classification in 1988:

Stage I: The CMC joint is normal or early narrowing may be present, no subluxation or osteophytes.

Stage II: Narrowing or small ulnar osteophytes, subluxation less than one-third.

Stage III: Marked narrowing and significant osteophytes, subluxation more than one-third, occasional peritrapezial arthrosis.

Stage IV: Loss of articular contact, more significant subluxation. Often peritrapezial arthrosis.

It is important to demonstrate and recognise subluxation as described in both Eaton and Littler[2] and Dell *et al.*'s[5] classification stages I and II because at this stage a repair of the beak ligament, to prevent subluxation, is still a surgical option. In stage III disease, excision of the trapezuim has become the treatment of choice, although arthrodesis of the trapezio metacarpal joint is also a possibility.

In stage IV disease with peritrapezial arthritis excision of the trapezium or a replacement of the CMC joint is the treatment of choice.

Good radiographic studies make it possible for the orthopaedic surgeon to stage the disease accurately and therefore to apply the right treatment option.

References

1. Armstrong AL, Hunter JB, Davis TRC. The prevalence of degenerative arthritis of the base of the thumb in post-menopausal women. *J Hand Surg* 1994: **19B:** 340-341.
2. Eaton RG, Littler W. Ligament reconstruction for the painful thumb carpometacarpal joint. *J Bone Joint Surg* 1973; **55A:**1655-1666.
3. Pelligrini VD. Osteoarthritis at the base of the thumb. *Orthop Clin North Am* 1992; **23:** 83-102.
4. Robert P. *Bulletins et Memoires de la Soviete de Radiologie Medicale de France* 1936; **24:** 687.
5. Dell PC, Brushart TM, Smith HRJ. Treatment of trapezio-metacarpal arthritis: Results of resection anteroplasty. *J Hand Surg* 1978; **3:** 244.