Degenerative changes of the trapeziometacarpal joint: radiologic assessment

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Abstract. The trapeziometacarpal joint is particularly prone to osteoarthritis due to the great amount of stress applied with everyday activities with the hands. In this essay, radiologic assessment and staging of “basal joint” osteoarthritis, treatments based on radiologic staging and intraoperative findings, and surgical complications are described.

Key words: Trapezoidal joint – Osteoarthritis – Degenerative changes – Staging

The trapeziometacarpal (TMC) joint or so-called “basal joint” provides the thumb with a wide range of motion that includes flexion-extension, abduction-adduction and axial rotation. The thumb’s agility is afforded mainly by the TMC joint’s saddle-shaped articular facets, which glide on top of one another in multiple axes (Fig. 1). Inherent to any joint’s wide range of motion is its instability. The TMC joint’s instability is limited by the surrounding muscles, capsule, and particularly by the constraining ligaments. However, despite these support structures, often the saddle-shaped surface lies in incongruous positions. Also, the basal joint absorbs a high degree of compressive and shear stresses during pinch, grasp, and direct compression. When the above conditions are added to the chronic inflammatory synovitis, idiopathic hormonal changes, repetitive stress, prior trauma, and ligament laxity, the basal joint is primed for degenerative changes. The basal joint undergoes a gradual attrition of the articulating surfaces with resultant painful synovitis, osteophyte formation, and progressive subluxation. [1]. The degenerative changes are especially common in middle-aged or postmenopausal women.
Radiographic examination

The standard examination of the TMC joint should include posterior-anterior oblique, and lateral views of the thumb. A true lateral view of the thumb should show superimposition of the metacarpophalangeal sesamoids. This view is particularly helpful in showing early degenerative changes at the dorsolateral aspect of the joint (Fig. 2). In addition, in our institution, a “stress view” is also obtained. This is a posterior-anterior projection of the TMC joints under lateral stress. The radiograph is obtained with the plane of the thumbnails parallel to the X-ray cassette with the patient pushing the tips of the radial side of the thumb against each other (Fig. 3). The X-ray beam is centered at the TMC joint level. The “stress view” demonstrates the degree of laxity of the TMC joint and provides a comparison view of the other thumb. It also shows an excellent posterior-anterior view of the scaphotrapezial (ST) joint.

Fig. 4A, B. Stage 1. The pre-arthritic thumb. Widening of the trapeziometacarpal joint space is seen in both lateral and stress views. The widening is apparent when compared with contralateral asymptomatic side and with rest of the carpo-metacarpal joint spaces. Periarticular soft tissue swelling is distinctly evident in both views. C Stage 2. Minimal subchondral sclerosis and joint space narrowing with small hypertrophic spurs (arrowheads) are present. D Stage 3. The transition stage. Definite TMC joint space narrowing and subchondral sclerosis with significant hypertrophic spurs are present. The trapezioavicular joint (arrow) is normal. The first proximal phalanx is hyperextended to compensate for the dorsal subluxation of the TMC joint. E Stage 4. Marked deterioration of the TMC joint, and subchondral sclerosis (arrow) of the ST joint is present. Involvement of all articular facets of the trapezium leads to so-called pantrapezial arthritis.