

findings of triple-injection cinerthrography of the wrist with those of arthroscopy. *J Bone Joint Surg* 1996;78A:348–356.

4. Trumble TE, Gilbert M, Vedder N. Isolated tears of the triangular fibrocartilage: management by early arthroscopic repair. *J Hand Surg* 1997;22A:57–65.

In Reply:

We appreciate Dr Slater's comments on our recently published case report. He raises specific concerns regarding the arthrographic findings compared with the arthroscopic findings in addition to the "extensive battery of diagnostic tests" used in the workup of the patient. We appreciate the opportunity to clarify these concerns.

After its introduction in 1961,¹ wrist arthrography did not gain in popularity for several decades. The use of triple-injection techniques was later advocated to diagnose lesions that might not be visualized by single-injection techniques; these are currently the standard for wrist arthrography.^{2–5} Despite multiple studies regarding the abnormal and normal arthrographic findings, none has discussed or addressed the capitolunate articulation or axial carpal instabilities. Thus, reported sensitivities and specificities cited in previous studies^{6–9} cannot be applied to the axial carpal instability patterns. The finding of a negative arthrogram for the dynamic axial carpal instability is not surprising. The term "dynamic" refers to instability that requires a provocative maneuver to illicit instability. Unfortunately, when triple-injection arthrography is performed, provocative maneuvers are typically performed to accentuate scapholunate, lunotriquetral, or TFCC pathology, not capitolunate or axial dissociative pathology.

Dr Slater comments on the discrepancy of the preoperative arthrogram finding of a "slight leak" of dye through the TFCC that "was large enough to mandate repair." As reported by Trumble et al,⁶ type 1B (peripheral) tears seldom demonstrate positive arthrographic findings. Arthroscopy continues to be the most accurate means of diagnosis of TFCC pathology. This was the case in our patient. Arthroscopy demonstrated a type 1B tear, although small, that was amenable to arthroscopic repair.

Another issue raised by Dr Slater is the potential discrepancy of attributing patient's symptoms to dynamic capitolunate instability rather than the small peripheral TFCC tear. A careful evaluation of the case history reveals that the patient's pain was distal to the TFCC, and that pain was not aggravated by

loaded ulnar deviation and extension. The bone scan demonstrated increased uptake in the capitolunate joint area as well. These findings, in addition to the marked improvement in grip strength and pain from the midcarpal injection of lidocaine, were viewed as sufficient evidence for an intracarpal process involving the midcarpal joints. As there were no dye leaks between the midcarpal and radiocarpal rows on arthrography, the lidocaine injected into the midcarpal joint would not affect the TFCC or radiocarpal joint. Thus, the primary pathology was within the midcarpal joint, not the TFCC, as was corroborated by arthroscopic and clinical follow-up examinations.

An absence of scapholunate or lunotriquetral ligament abnormalities on arthrogram or magnetic resonance imaging does not preclude partial ligament injury, such as lengthening or attenuation of the fibers. Such an injury may be sufficiently disruptive to produce at least dynamic carpal instability.

Dr Slater comments on the diagnostic tests used to evaluate this patient. Before our initial evaluation of the patient, multiple wrist x-rays and a triple-injection arthrogram had already been obtained. As our initial clinical examination raised suspicion for fracture of the hook of hamate, appropriate studies for the diagnosis were obtained. We agree with Dr Slater in that diagnostic tests should be obtained in an efficient and cost-effective manner. In a case in which the diagnosis has not been made, however, what are the appropriate diagnostic studies or tests? The appropriate diagnostic studies or tests are those, considering the clinical findings, that will most likely help to establish the correct diagnosis as expeditiously and as cost-efficiently as possible.

Our patient was receiving workers' compensation and has since returned to work. Whether or not secondary gain affected the outcome of this patient, his dramatic improvement in postoperative pain, grip strength, and carpal stability confirm the pathologic process. It is difficult to recommend how to counsel patients suspected of similar pathology based on a single case report. We hope our report serves to alert hand surgeons to consider capitate hamate instability in their differential diagnosis of ulnar-sided wrist pain.

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