Carpal Coalition With Radioscaphoid Synostosis and Hypoplastic Thumb

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Abstract

Carpal coalition is an anomaly that is usually discovered as an incidental finding on roentgenograms. The most common site is between the lunate and the triquetrum, though fusion of almost every combination of carpal bones has been reported. Carpal coalition can be isolated but has also been associated with numerous congenital malformation syndromes. In this article, we report the case of a 12-year-old boy with left-sided asymptomatic fusion of the trapezoid and trapezium, fusion of the radius and scaphoid, and hypoplasia of the thumb.

Congenital coalition of carpal bones is usually an asymptomatic condition that is identified on roentgenograms obtained for other reasons. The upper extremities normally develop over weeks 5 through 8 of intrauterine life. During this time, the cartilage becomes cleft into separate structures that eventually form articulations. Failure of the intercarpal joints to separate and individually ossify leads to carpal coalition.[1]

Fusion of almost every combination of carpal bones has been reported, as have numerous carpometacarpal and radiocarpal fusions.[2] The most common carpal fusion involves the lunate and the triquetrum; reported rates are 0.1% in Caucasians, 1.6% in African Americans, and 9.5% in certain Nigerian populations.[1,3] Fusion of the trapezoid and the trapezium is less common—no well-accepted incidence rates have been published—and has been described in persons of both European[4] and African[5] descent. Radiocarpal fusions are less common than simple carpal fusions but have involved the scaphoid or the lunate.[2]

Hypoplasia of the thumb is a complex congenital disorder that is often detrimental to hand function.[6] Much of the literature addresses the characteristics of patients with coexisting radial dysplasia. Hand anomalies that occur with thumb hypoplasia include syndactyly, camptodactyly, and hypoplasia of other digits.[7] Case reports have identified instances of thumb hypoplasia associated with radioscaphoid synostosis.[8,9]

In this article, we report the case of a 12-year-old boy with left-sided asymptomatic fusion of the trapezoid and trapezium, fusion of the radius and scaphoid, and hypoplasia of the thumb. The patient's guardians provided written informed consent for print and electronic publication of this case report.

Case Report

A 12-year-old white boy presented to the pediatric orthopedic clinic for left wrist evaluation after being hit by a baseball 2 weeks earlier. The patient was splinted in the emergency department at time of injury and was told to follow-up in our clinic. His wrist pain improved since the injury, but the distal radius was still minimally tender to palpation.

The left wrist and hand were neurovascularly intact. The left wrist had full range of motion in all planes, including pronation and supination. Grip strength was strong and equal bilaterally on clinical examination; the patient did not undergo formal grip strength testing, but some diminution of grip strength would be expected with a hypoplastic thumb. The left thumb was notably hypoplastic (Figure 1), with normal mobility in both the metacarpophalangeal joint and the interphalangeal joint. There was mild clinical laxity of the metacarpophalangeal joint. The patient felt that his left thumb function was similar to his contralateral thumb function; he stated that he had no limitation in function or strength in the left hand, though he was well aware that its thumb was smaller. The right hand and thumb appeared clinically normal. The patient was otherwise

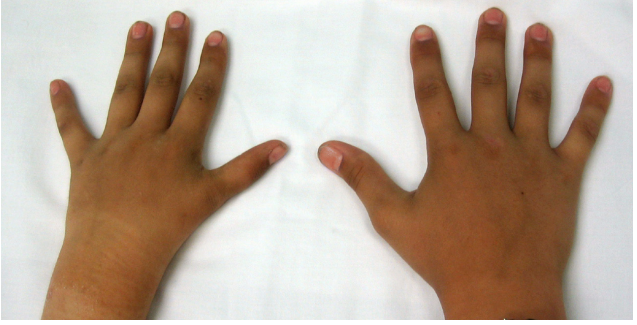

Figure 1. Hypoplasia of left thumb with otherwise normal anatomy of bilateral hands and wrists.

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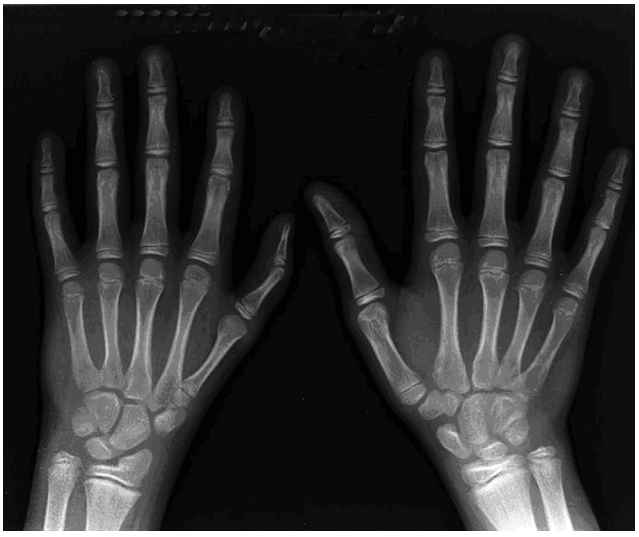

Figure 2. Comparison view shows trapezoid–trapezium fusion, radioscaphoid synostosis, and hypoplastic left thumb.

healthy and had no other anomalies.

Radiographs of the left wrist showed trapezoid–trapezium fusion, radioscaphoid fusion, and hypoplastic metacarpal and phalanges of the thumb. Radiographs of the right wrist were normal. A comparison view best demonstrates the bony asymmetry (Figure 2).

Discussion

Congenital coalition can be either isolated or part of a congenital malformation syndrome. An isolated fusion usually involves only 2 bones, whereas a syndrome-associated fusion often involves 3 bones or more. Congenital carpal coalitions have been associated with syndromes such as arthrogryposis, symphalangism, hand–foot–uterus syndrome, and chondroectodermal dysplasia.[10] The present case, with its lack of anomalies aside from the left hand and wrist, seems not to fit any of these syndromes.

Cases of radioscaphoid synostosis with ipsilateral hypoplasia of the thumb have been reported. Wulle[9] described a case with such anomalies, including a more severe contralateral hypoplastic thumb. Gurkan and colleagues[8] presented a case of radioscaphoid synostosis, ipsilateral and contralateral thumb hypoplasia, and contralateral scaphoid hypoplasia. Both of these cases had otherwise normal carpals and no abnormalities on physical examination. To our knowledge, however, the combination of radioscaphoid synostosis, thumb hypoplasia, and carpal coalition was not reported until now.

Authors' Disclosure Statement

The authors report no actual or potential conflict of interest in relation to this article.

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This paper will be judged for the Resident Writer's Award.