

CASE REPORT

Congenital fusion of the trapezium and trapezoid

J. TERRENCE JOSE JEROME

*Department of Orthopedics,
St. Stephen's Hospital, Tiz Hazari, Delhi, India*

Abstract

We report an unusual case of carpal coalition between trapezium and trapezoid in a 54-year-old man who was diagnosed after a pain in left wrist following a night's sleep. The patient was otherwise asymptomatic.

Keywords: congenital fusion, trapezium, trapezoid.

Introduction

Coalition among the various carpal bones is seen in any possible combination. It can occur either as an independent entity or in association with syndromes and metabolic disorders.

Patient and methods

A 54-year-old man came to our hospital with left side wrist pain following night sleep. He was otherwise in good health with no chronic medical illness. There was no swelling or tenderness in the wrist. The wrist had normal range of motion with no crepitus, and spasm.

Results

Radiographs revealed fusion at trapezium and trapezoid (Figure 1, a and b).

Stress radiograph (Figure 2) showed compensatory widening of the scaphoid–trapezium–trapezoidal joints. Analgesics and gripper to the left wrist was given. The patient became asymptomatic within three days and is doing his normal activities.

Discussion

Carpal fusions are relatively common, usually asymptomatic abnormalities that occur as normal variations in about 0.1% of the population [1].

Carpal coalitions are implied to develop from failure of segmentation of the primitive cartilaginous canals and absence of joint formation. An absence of joint cavitation in the embryo and chondrification of the joint interzone leads to this phenomenon of carpal synostosis.

Carpal coalition is usually asymptomatic. There are no functional motor deficits with a coalition. There have been reports of symptomatic pisiform coalition, scapholunate triquetral coalition, and scaphoid trapezium synchondrosis [2].



Figure 1 – (a), (b) Fusion of trapezium–trapezoid with normal trapezio–metacarpal joint



Figure 2 – Stress radiograph shows widened joint space in the scaphoid–trapezium–trapezoid joint complex

Generally isolated carpal fusions involve two bones of the same row, while the syndrome associated fusions are quite often multiple. Acquired fusion can occur secondary to arthritis, trauma or as a metaplastic conversion of intra-articular structures such as fibrous tissue, ligaments or cartilage to bone (all being mesodermal derivatives). It may be a result of surgery done for joint stabilization [2, 3].

Though mostly asymptomatic and thus usually a chance finding discovered on radiographs taken for unrelated reasons these may be associated with symptoms due to loss of movement between the fused bones.

Stretching of the surrounding soft tissues leads to sprain causing pain, fractures are common and at times carpal bossing may also occur.

Anthropological significance of this fusion anomaly cannot be ignored which may be considered a step towards specialization of hand or an attempt to stabilize the postaxial border of hand.

Radiographic appearances of carpal fusion is present in diverse forms such as bones may be completely united or partially so with notch present or there may be narrowing of joint space and many other indicated in the Singh's classification [3].

The most common coalition occurs between the lunate and triquetrum. Next in frequency is a coalition between the capitate and hamate [4].

Multiple bone fusion may involve any number of carpals or all carpals appearing as a single mass. It is a common feature present in syndrome-associated fusions such as Ellis van Creveld syndrome, arthrogryposis, symphalangia, diastrophic dwarfism, Turner's syndrome. Fusions may be complete when actual union occurs with no joint space present or less commonly may be incomplete with narrowing of joint space between the two bones without adjacent sclerosis or osteophytosis [5].

Any two-ossific centers lying adjacent may exhibit fusion those on the ulnar side and occupying the same row are more commonly involved [6].

Fusion of carpal bones is hereditary and the trait is transmitted as Mendelian dominant factor, which is not sex-linked [7].

Complete or incomplete coalition of the carpus normally does not interfere with the external appearance or function of wrist [8]. However, these may at times become symptomatic leading to pain and discomfort.

With movement lost between the fused bones, compensatory increase in motion at surrounding joints along with stretching of soft tissue restraints predisposes to recurrent sprains causing pain under stressful conditions. Occasionally this may also result in carpal bossing – “an overgrowth of bone in response to stress” [9].

A fused bone is also more exposed to the risk of fracture with subsequent cyst formation and pseudoarthrosis. Persistence of grooves, notches and cavities at the site of fusion appears to be a factor contributing towards fracture [10].

Our patient's pattern of coalition represents a unique case, being especially in a healthy individual and not as part of a syndrome.

☐ Conclusions

Trapezium trapezoid fusion is mostly an asymptomatic condition. It may present symptoms by virtue of alteration of the normal biomechanics of the wrist thus predisposing the contributing joints and the surrounding soft tissues to abnormal stress.

Treatment is rarely required for the asymptomatic cases.

Clinicians should recognize this coalitions (or carpal coalitions in general) could be a part of syndromic manifestations.

Multiple radiographs may be required for proper definition.

Treatment is usually symptom based.

References

- [1] RESNICK D., NIWAYAMA G., *Diagnosis of bone and joint disorders*, 2nd edition, W. B. Saunders Co., Philadelphia, 1988, 3560–3561.
- [2] KNEZEVICH S., GOTTESMAN M., *Symptomatic scapholunate-triquetral carpal coalition with fusion of the capitate-metacarpal joint. Report of a case*, Clin Orthop Relat Res, 1990, (251):153–156.
- [3] SINGH P., TULI A., CHOUDHRY R., MANGAL A., *Intercarpal fusion – a review*, J Anat Soc India, 2003, 52(2):183–188.
- [4] INGRAM C., HALL R. F., GONZALEZ M., *Congenital fusion of the scaphoid, trapezium, trapezoid and capitate*, J Hand Surg [Br], 1997, 22(2):167–168.
- [5] RESNIK C. S., GRIZZARD J. D., SIMMONS B. P., YAGHMAI I., *Incomplete carpal coalition*, Am J Roentgenol, 1986, 147(2):301–304.
- [6] O'RAHILLY R., *A survey of carpal and tarsal anomalies*, J Bone Joint Surg Am, 1953, 35–A(3):626–642.
- [7] HENRY M. G., *Anomalous fusion of the scaphoid and the greater multangular bones*, Arch Surg, 1945, 50:240–241.
- [8] DEVILLIERS MINNAAR A. B., *Congenital fusion of lunate and triquetral in the South African Bantu*, J Bone Joint Surg Br, 1952, 34–B(1):45–48.

-
- [9] GEUTJENS G., *Carpal bossing with capitate-trapezoid fusion. A case report*, Acta Orthop Scand, 1994, 65(1):97–98.
- [10] COCKSHOTT W. P., *Pisiform hamate fusion*, J Bone Joint Surg Am, 1969, 51(4):778–780.

Corresponding author

J. Terrence Jose Jerome, MD, MBBS, DNB (Ortho), MNAMS (Ortho) FNB (Hand & Microsurgery), Reconstructive Orthopedics, Hand and Micro surgeon, Department of Orthopedics, St Stephen's Hospital, Tiz Hazari, Delhi 54, India; Phone 911–09868086916, E-mail: terrencejose@gmail.com

Received: April 15th, 2008

Accepted: May 8th, 2008