

Case Report

UNILATERAL SYNOSTOSIS OF NAVICULAR AND LATERAL CUNEIFORM BONES: A CASE REPORT OF A RARE ANOMALY

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ABSTRACT

The unusual fusion of two or more tarsal bones is called tarsal synostosis. Tarsal synostosis is a frequent cause for foot and ankle pain. The most commonly encountered synostosis are between calcaneo-navicular and talo- calcaneal bones. Other types of synostosis such as the Naviculo-Cuneiform synostosis are very rare. During routine study of bones in the department of Anatomy at K.S.Hegde medical Academy, Mangalore, Karnataka an unusual fusion between the right navicular and the right lateral cuneiform bone by a bar of bone was observed. This type of synostosis is very rare, which prompted us to report the case. The knowledge about this rare variation is important for orthopaedic surgeons while investigating a case with foot pain. It is also important for accurate diagnosis of symptoms and radiographs of the foot. Its embryological cause and clinical significance will be discussed.

Key Words: *Tarsus, Navicular Bone, Cuneiform Bone*

INTRODUCTION

The unusual fusion between tarsal bones is a frequent cause of foot and ankle pain which is often overlooked by doctors. The overall incidence of tarsal synostosis in the general population is less than 1% (Stormont and Peterson, 1983). The rate may be higher because patients are commonly asymptomatic and tarsal coalition is incidentally discovered. Therefore, estimating the true incidence in the general population is difficult. The most commonly encountered synostosis is Calcaneo-navicular (53%) followed by talo- calcaneal synostosis (37%). The other types are infrequent (Stormont and Peterson, 1983). There is a slight male predominance, and the condition is bilateral in approximately 50 % of the cases (Perlman and Wertheimer, 1986). Tarsal synostosis can occur as an isolated anomaly or in association with other congenital disorder. Additional complaints such as stiffness, pain and tenderness on the plantar surface of midfoot can be present. In some cases it can be asymptomatic. Clinically, the incidence of pain in the foot is increasing and its correlation to naviculo-cunieform synostosis is important. The present report presents a case of synostosis between right navicular and right lateral cuneiform bone fused by a solid bar of bone. Its embryological correlation and clinical significance is discussed.

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During the routine study of bones in the department of Anatomy at K.S.Hegde Medical Academy, Mangalore, Karnataka, we observed an unusual fusion between the right Navicular bone and right lateral Cuneiform bone which were connected by a solid bar of bone (Figures 1, 2).

DISCUSSION

The earliest known mention of tarsal synostosis in the literature was by Buffon, (1796). Tarsal synostosis may be congenital or acquired secondary to trauma, infection, surgery, or articular disorders. The majority of Tarsal synostosis are congenital and has autosomal dominant pattern of inheritance. The union may be either complete or incomplete. The Synostosis can be bony (synostosis), cartilaginous (synchondrosis) or fibrous (syndesmosis) (Thometz, 2000). In the present case the union was bony and incomplete. Whether the synostosis was congenital or acquired could not be determined. There was only one case of bilateral

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navicular and third cuneiform synostosis fused by a solid bar of bone reported in literature (Hans *et al.*, 1977).

Two theories have been proposed as a cause of tarsal synostosis. One theory proposed that the synostosis were caused due to incorporation of accessory ossicle into adjacent normal tarsal bone (Harris and Beath, 1948). But the most accepted theory is of Leboucq which states that the failure of segmentation of primitive mesenchyme as the cause of tarsal synostosis (Jack, 1954). Tarsal synostosis can occur as an isolated anomaly or is associated with other congenital disorders. Carpal coalition, transposition of the maxillary canine and first premolar were found to significantly associated with naviculo-cunieform coalition. Computerized tomography (CT) scan is the most reliable test for evaluating naviculo-cunieform coalitions and demonstrating its morphology (Lee *et al.*, 2002). Magnetic resonance imaging (MRI) is especially essential in the detection of nonosseous fibrous and cartilaginous coalitions (Emery *et al.*, 1998).



Figure 1: Photograph showing the fusion of right lateral cuneiform and navicular bone on dorsal aspects



Figure 2: Photograph showing the fusion of right lateral cuneiform and navicular bone on ventral surface

Only two cases of synostosis between the navicular and lateral cuneiform bone has been reported in literature (Hans *et al.*, 1977; Henry and Lusby, 1959). Therefore, the present case deserves documentation. This report will be helpful to orthopaedicians while determining the cause of painful feet with decreased mobility and deformity of the foot.

Conclusions

The unilateral tarsal synostosis between Navicular and lateral Cuneiform bones is a rare deformity. It is a autosomal dominant trait. A comprehensive awareness and understanding of the lesion and its signs and symptoms will help the orthopaedicians dealing with the case of foot pain and deformity of the foot. Naviculo cuneiform synostosis are uncommon entities that must be suspected in an adolescent with painful feet who also has decreased mobility and deformity of the feet. CT and MRI scan are the most reliable test for evaluating naviculo-cunieform coalitions and demonstrating its morphology.

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