International Journal of Biomedical Research

ISSN: 0976-9633 (Online)
Journal DOI:10.7439/ijbr
CODEN:IJBRFA

Case Report

Bilaterally symmetrical tibiofibular synostosis – A rare incidental finding

Prachi Saffar Aneja[*1] Manish Aneja[2], Kuldip Singh Sood[3] and . Shweta Asthana[4]

[1]*Assistant Professor, Department of Anatomy SGT MC Budhera Gurgaon, India*
[2]*Attending Consultant, Department of Anaesthesia, Medanta – The Medicity Gurgaon, India*
[3]*Professor and Head, Department of Anatomy SGT MC Budhera Gurgaon, India*
[4]*Assistant Professor, Department of Anatomy MG MC Jaipur, India*

***Correspondence Info:**
Dr. Prachi Saffar Aneja,
Assistant Professor Anatomy,
SGT MC Budhera Gurgaon, India
Email: dr.prachi@yahoo.co.in

Abstract

Introduction: Tibiofibular synostosis is an uncommon presentation and may involve the proximal , middle or distal tibiofibular joint. As it has a wide spectrum of clinical presentations the author aims to make the clinician aware of this possible differential diagnosis.

Materials and methods: The bone specimen described was obtained from the osteology museum of SGT Medical College. The measurements were taken with sliding vernier caliper and flexible steel tape.

Observations: A bilaterally symmetrical tibiofibular synostosis was observed at the junction of middle and distal one-third with slight bowing of fibula in the mid shaft region.

Discussion: Although the middle tibiofibular synostosis is usually acquired the bilateral symmetry of synostosis with no evidence of callus formation or trauma in the present case favours congenital etiology. The normal length and shape of fibula along with an absence of any growth abnormalities favours the hypothesis that the synostosis developed in adult life i.e. after the closure of the growth plates. Thus the author alerts the clinician to always rule out synostosis in every case of abnormality in leg whether during primary examination or follow-ups after operation. As a rule bilateral evaluation and comparison is necessary because the treatment modality depends not only on clinical picture but also on it's etiology and pathology.

Keywords: bilateral, congenital , interosseous membrane ,tibio-fibular synostosis

1. Introduction

Tibiofibular synostosis is an uncommon presentation wherein a bony bridge develops between the tibia and fibula at any of the mentioned three sites i.e. at the proximal tibiofibular joint, middle tibiofibular joint (in the region of interosseous membrane) or at the distal tibiofibular joint. It can occur in either sex and may be congenital or acquired.

Literature suggest that proximal tibiofibular synostosis is usually congenital (mainly sporadic and not inherited). It may be due to intrauterine trauma , infection , growth arrest or any such cause. The congenital form is more often than not accompanied with other deformities such as distal positioning of the proximal tibiofibular joint, leg length discrepancy, bowing of the fibula, or valgus deformity of the knee. The middle and distal tibiofibular synostosis are mainly acquired: may be idiopathic, iatrogenic , secondary to trauma or as a result of some pathological process such as a tumour[1].

The normal distal movement of the fibula relative to the tibia helps to deepen the ankle mortise and tighten the interosseous membrane thereby stabilizing the ankle during maximum weight-bearing and stress[2]. Tibiofibular synostosis

may affect this distal movement of fibula leading to shortening of lateral malleolus , ankle valgus and prominence of the fibular head at the knee[3]. It may also affect the gait especially during midstance and preswing phase of the gait cycle 1.

Tibiofibular synostosis may thus lead to ankle deformity and pain. Symptoms are mainly pain while running and ankle discomfort even on rest.

The diagnosis of synostosis is established radiologically. As a rule both the limbs should be radiographed and compared. Once confirmed on X-ray CT scan or MRI are useful advanced diagnostic tools . They help to detect the underlying cause such as callus formation after trauma or tumour growth. Bone scan is helpful in selected cases.

Asymptomatic tibiofibular synostosis do not require any specific treatment . For those causing ankle disability, ankle pain or cosmetic defect corrective osteotomy or resection of the bony bridge following maturation of the callus are advised[4].

The author thus aims to bring it to the notice of the clinician that a large number of clinical presentations are associated with tibiofibular synostosis. This differential diagnosis should always be kept in mind, evaluated and excluded while dealing with abnormalities in leg. As a rule both the legs should be evaluated and compared.

2. Materials and Methods

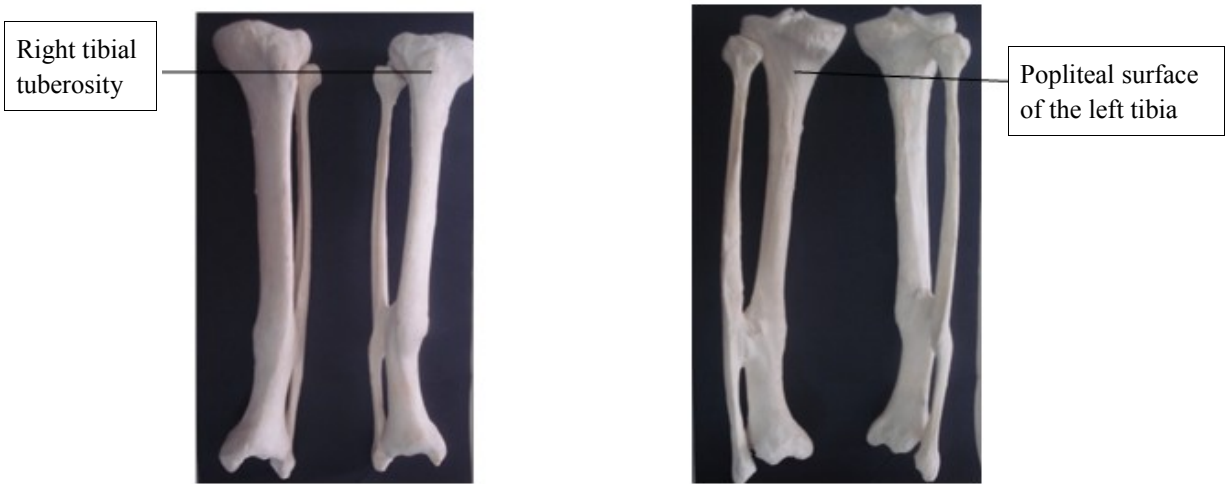
The bone specimen described in the present study was obtained as an incidental finding in the osteology museum of SGT Medical college. The measurements were taken with the help of a sliding vernier caliper and flexible steel tape (each linear measurement was recorded to the nearest millimeter).

3. Observations

Sr. No	Variable	Left side	Rright side
1	maximum length of tibia	33.1cm	32.8cm
2	maximum length of fibula	32.5 cm	32.2 cm
3	synostosis begins at (tibia)	21.6 cm	21.3 cm
4	maximum length of synostotic part	04.4 cm	04.2 cm
5	maximum breadth of synostotic part	02.3 cm	02.2 cm

Slight bowing of the fibula is present in the midshaft region leading to stretching of interosseous membrane.

Anterior view **Posterior view**



4. Discussion

The author illustrates a case of bilaterally symmetrical synostosis of middle tibiofibular joint. The osseous brigde is present at the junction of middle and distal thirds. Synostosis of the middle tiboifibular joint (formed by the interosseous membrane) may be located at the junction of the proximal and middle third of the tibia[5] or at the junction of middle and distal third of the tibia[1]. Although the middle tibiofibular synostosis is mostly acquired the bilateral symmetry of synostosis with no evidence of callus formation or trauma in the present case favours congenital etiology. Bergmann e reported a case of bilateral synostosis which was congenital in origin[6].

Gamble and O'Dwyer stated that whenever the synostosis is present from birth or occurs before the closure of the proximal tibial growth plate, it is often symptomatic and may be associated with other growth deformities[7,8]. The absence of any growth abnormalities indicates that the synostosis occurred after physeal closure[9]. In the present case also the fibula is of normal length and shape though there is a mild bowing of bone in mid shaft region .The position of the proximal tibiofibular joint is also normal. This favours the hypothesis that the synostosis developed in adult life i.e. after the closure of the growth plates. After extensive bibliographic search the author could only cite three such patients [9,10,11].

As already stated the bone specimen under study was obtained as an incidental finding so the history of the individual was not available. Thus it is not possible to comment upon the cause of the synostosis , it's time of onset neither can we remark on the symptoms experienced by the individual when alive. But the author can safely hypothesize that this congenital synostosis developed in adult life. Mandel and Takai also stated that, synostosis of the proximal TFJ in adults is rarely associated with complaints and may, therefore, be easily missed[9,10].

There are very few isolated case reports of congenital distal tibiofibular synostosis[12]. Synostosis of the middle-third of the diaphysis of the tibia and fibula has been described previously in football and basketball players[13,14]. The synostosis may cause compression of extensor hallux longus and extensor digitorum longus tendons[1], or may cause anterior compartment-type symptoms of pain in the lower leg[14]. Management in such cases may be conservative or surgical. There is an ongoing debate on the treatment of choice. Henry *et al*[14] advocate successful treatment by conservative measures while a few others such as Hakan[15] and Flandry[4] support surgical resection. They opine that idiopathic mid-diaphyseal synostosis does not respond to conservative management and is best treated by resection. There is however one major drawback, that a high rate of recurrence has been noted, particularly in cases of congenital synostosis, specifically in the region of the distal tibiofibular joint. Recurrence is not related to the surgical procedure applied. However it is prudent to remove all the pathological bone and operate only when the callus has matured[13].

The author would thus like to conclude on the note that since tibiofibular synostosis is associated with a large number of congenital syndrome and has a wide spectrum of clinical presentation such as ankle pain, ankle deformity, pain on running, anterior compartment syndrome, valgus deformity and so on and so forth a clinician must always rule out synostosis while evaluating such cases. It can be secondary to operation of ankle fractures or distal fractures of the tibia and fibula. Synostosis and crossunion may also develop following operation on leg and may complicate the normal healing process. Thus it is imperative for surgeons to radiologically evaluate every case in follow-ups for surgery on leg. As a rule bilateral evaluation and comparison is necessary because the treatment modality depends not only on clinical picture but also on it's etiology and pathology. The best recommended treatment is conservative but surgery may be advised for athletically active or sports-person.

References

1. Jiang-Hue Fu, Chyi-Chyuan Hwang, and Tai-Hung Chao. Tibiofibular synostosis in a military soldier. *J Med Sci* 2003; 23(2):135-138.
2. McMaster, J., and Scranton, P., Tibiofibular synostosis, a cause of ankle disability. *Clin Orthop*. 1975; 111:172-174
3. Frick, SL., Shoemaker, S and Mubarak, SJ., Altered fibula growth patterns after tibiofibular synostosis in children, *J Bone Joint Surg Am* 2001; 83-A;247–254.
4. Flandry F. Sanders R. A tibiofibular synostosis an unusual case of shin-splint-like pain. Am. *J. Sports. Med.* 1987, (15) 280-84.

5. Leninbabu V., Shenbaga N. , Komarasamy B. , and Paul A. "Proximal tibiofibular synostosis as a source of ankle pain: a case report," *The Iowa Orthopaedic Journal*, 2006; 26: 127–129.
6. Bergmann e. Congenital tibiofibular synostosis. I*nt Coll surg* 1941; 4:359 .
7. Gamble J. G. "Proximal tibiofibular synostosis," *Journal of Pediatric Orthopaedics*, 1984; 4 (2): 243–245,.
8. O'Dwyer K. J. , "Proximal tibio-fibular synostosis. A rare congenital anomaly," *Acta Orthopaedica Belgica* 1991;57 (2): 204–208,.
9. Takai S, Yoshino N, and Hirasawa Y. "Unusual proximal tibiofibular synostosis," *International Orthopaedics* 1999:; 23 (6): 363–365.
10. Mandal S. and Coleman N. "Proximal tibiofibular synostosis following tibial nailing: a case report and review of literature," *Injury Extra* 2005; 36 (10): 418–420.
11. Nishikawa T, Yamamoto T, Yoshiya S, and Kurosaka M, "Intermittent peroneal mononeuropathy due to proximal tibiofibular synostosis," *Journal of Neurology* 2003; 250 (3): 352–353.
12. Grobelski M. Congenital tibiofiblar synostosis of the distal end of the lower leg. *Arch Orthop Unfallchir.*1965 Mar 5;57:190-3.
13. James S. H, Carpenter E. C, Fairclough J. A. Tibiofibular synostosis in a professional football player. *J Bone Joint Surg [Br]* 2007; 89-B:109-11.
14. Henry JH, Anderson JA, Cothren CC. Tibiofibular synostosis in professional basketball players. *Am J Sports Med* 1993;21:519-622.
15. Håkan I, Magnusson HI, Westlin NE, *et al*. Abnormally decreased regional bone density in athletes with medial tibial stress syndrone. *Am J Sports Med* 2001;29:712-15.