

CASE REPORT



BILATERAL DISTAL TIBIO-FIBULAR SYNOSTOSIS: A CASE OF MORPHOLOGICAL DEFORMITY IN CADAVERIC REMAINS OF BLACK ETHNICITY AT THE DEPARTMENT OF ANATOMY, EQUATOR UNIVERSITY OF SCIENCE AND TECHNOLOGY

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ABSTRACT

Tibial fibular synostosis is a rare congenital or acquired abnormality with most cases identified coincidentally upon clinical presentation. Distal tibio-fibular synostosis are reported to be secondary to traumatic events; and whereas Unilateral distal Tibial fibular synostosis have been widely documented, bilateral occurrences are rare among persons of black ethnicity. The objective of this report is to elaborate a rare occurrence of bilateral distal tibial fibular synostosis incidentally found during a bone preparation procedure in a gross anatomy laboratory. This was a distally located bone fusion with exostoses, involving the anterior, medial and posterior surfaces of the tibial-fibular bones. The causative factor of this deformity in our case couldn't be ascertained since this was a cadaveric incidental finding with no life or clinical history to relate to. However with distal fusions and visible exostoses, we probably infer that this was synostosis of osteochondromatic origin. Permission to access the case specimens and present this report was sought and granted by the University Research and Ethics committee of Equator University of science and technology.

Keywords: Bilateral distal Tibial fibular synostosis, osteochondroma

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INTRODUCTION

Tibiofibular synostosis (TFS) is a rare condition where the tibia and fibular are structurally joined by bone tissue causes of which can be congenital, idiopathic or acquired (1) . Congenital TFS is caused by multiple hereditary exostoses (2) while secondary occurrences are attributed to factors like solitary osteochondromas and traumatic events (1, 3). The pathophysiology of traumatically caused synostosis is by calcification of hematomas surrounding the fractured bones or soft tissues that bridge over the interosseous membranes (4) ; the result of which is physical deformities such as valgus, leg length discrepancies and

malalignment in skeletally immature persons (2, 5). Cases of proximal TFS have been well documented in orthopedic surgery (3) however there is a paucity of information on distal TFS much less bilateral occurrences. To the best knowledge of the authors only two cases of unilateral distal TFS have been reported as incidental findings during cadaveric dissections in the African setting (6, 7) with none occurring bilaterally even in the Ugandan population. We therefore present a rare case of bilateral distal TFS observed in a cadaveric specimen in a gross anatomy laboratory at a private University in Uganda.

CASE REPORT

The objective of this report is to illustrate a rare occurrence of a bilateral distal tibio-fibular synostosis which was a incidentally found during a bone preparation procedure. Permission to access specimens was sought and granted by the University Research and Ethics committee board. Bones of a previously dissected black male cadaver were adequately skeletonized, boiled in water and sodium chloride concentrations; degreased with concentrations of acetone; bleached with hydrogen peroxide; aerated and dried at room temperature after intermittent washing. Specimens were checked for completion and observed with magnifying glasses by the team. Antero-posterior and Lateral X-Ray images (Figure 3) in addition to representative photos taken with a digital camera (Figures 1 & 2) were separately examined by each team member to eliminate bias.

Figure 1: Bony exostoses



- **Black** arrows point to the **Right** exostoses
- **Blue** arrows point to the **Left** exostoses

Figure 2: Distal Tibial fibular synostosis



- * **Black** arrow point to the **right** Tibial fibular synostosis
- * **Blue** arrow points to the **left** Tibial fibular synostosis

Anthropometric measurement (lengths) (Table 1) were taken using a graduated tape measure and these showed no major length discrepancies. No forms of valgus were noted.

The abnormality involved the medial, anterior and posterior distal borders of the Tibial fibular (TF) surfaces more prominently in the left bones than the right. Bone exostoses were remarkable anteriorly as shown in figures 1 and 2.

Table 1: Anthropometrics of the Tibial Fibular Bones and their anomalies

Limb	Length of bones	Length of anomaly
left	40cm	5 cm
Right	41cm	3 cm

Plain Antero-posterior and lateral X ray images (Figure 3) revealed opacities at the distal TF regions with no demonstrable fracture lines, no callus formations, no deformities or cavity infiltrations. Clinical / life history and information concerning the cause of death of the donor was unknown since this was an unclaimed body donated to the university for student study purposes. There had been no other observable gross

skeletal or systemic anomalies during the dissection process.

Figure 3: Plain X-ray Images showing bilateral distal tibial synostosis



*Arrows (black) Point to **right** Tibial fibular synostosis
*Arrows (blue) Point to **left** Tibial fibular synostosis

DISCUSSION

Distal tibial fibular synostosis (DTFS) is a rare bone anomaly usually attributed to bone physio-pathological changes occurring after traumatic events and surgical interventions such as osteotomies.(8) The hypothesis concerning the possible cause of the bilateral DTFS in our case is unknown due to unavailability of clinical and life history of the cadaveric donor. However, from the physical observation, the anterior bone exostoses are possible indicators of bilaterally occurring osteochondromas such as those reported by Bessler et al (9). The occurrence of any type of TFS is accompanied with morphological changes such as valgus, bone shortening, prominence of the fibular head moreover with such manifestations more common in congenitally caused TFS. (10) The above manifestations were not visualized from our case, in fact anthropometric measurements didn't show length discrepancies as would be the case if etiology was congenital. The plain X-Ray images revealed bilateral distal bone opacities joining the Tibia and fibular, with

no callus formation; fracture lines or other deformities. This could indicate that there were either no prior major traumas suffered by the individual or if present, complete bone healing and formation occurred with subsequent synostosis. In view of anterior bony exostoses, lack of gross structural changes to indicate prior trauma or congenital causes, this deformity was possibly caused by benign bone tumors such as osteochondromas. It is susceptible that were the individual to be alive symptoms of bilateral ankle pain, anterior compartment pain would be eminent (1) as in any other type of synostosis (2-4, 8).

CONCLUSIONS

We can't ascertain the exact cause of this deformity but infer to an idiopathic scenario with a possibility of osteochondromas. We therefore highly recommend exclusive investigations for all clinically presenting lower limb pains however mild to rule out such deformities in live persons.

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