Proximal Fibular Growth Deformities

John A. Ogden, M.D.

Departments of Surgery (Orthopedics) and Pediatrics, and the Human Growth and Development Study Unit, Yale University, New Haven, Connecticut, and the Newington Children's Hospital, Newington, Connecticut, USA

Abstract. Several congenital and acquired conditions may cause relative disparity between the length of the tibia and fibula, with alteration of the proximal tibiofibular joint and concomitant (or consequent) alteration of the distal tibiofibular relationships at both the malleoli and syndesmosis. Hypoplasia of the fibula may occur in association with neuromuscular disorders (e.g., poliomyelitis, arthrogryposis) or osteomyelitis, and is frequently accompanied by valgus deformity of the ankle because of proximal displacement of the lateral malleolus. The physes of the distal fibula and tibia may be level, rather than the fibular physis being adjacent to the tibial articular surface. Hyperplasia of the fibula may be associated with congenital subluxation or dislocation of the knee, various short stature syndromes (e.g., achondroplasia, spondyloepiphyseal dysplasia), and hypoplasia or aplasia of the tibia. The increased mobility of the proximal tibiofibular joint during the first eight to ten years of growth appears to be a major factor rendering the proximal end of the fibula susceptible to displacement secondary to relative longitudinal growth variations between the fibula and tibia. Recognition of such disparities at the proximal tibiofibular joint, especially during roentgenography, should alert the clinician to further evaluate possible accompanying deformity at the distal tibiofibular syndesmosis.

Key words: Skeletal development - Epiphysis - Fibula.

Recently Hsu, emphasizing that very little information is available regarding the clinical and radiologic presentation of fibular growth abnormalities, showed the disruption of the proximal tibiofibular relationship might be associated with valgus ankle deformity [11]. Studies by the author have shown a greater incidence of trauma to this region than previously ascribed [17-22]. In particular, children with heritable instability of the knee presented with symptoms resulting from proximal fibular hypermobility [17, 22]. In several instances the fibular head extended more proximal than normal, reaching the level of the knee joint. These clinical observations and the general lack of data prompted a search for other inherited or acquired disorders that might be associated with, or even cause, variations in the proximal tibiofibular relationship. However, unlike idiopathic subluxation [22], which was localized to the proximal tibiofibular joint, most of the cases to be described in this report involved the entire tibiofibular unit.

Case Material

The patient material was collected from the Section of Orthopedic Surgery, Yale University, Yale-New Haven Medical Center, and Newington Children's Hospital according to a previously described protocol directed at the anatomy, function, and clinical variations of the proximal tibiofibular joint [17]. Since the purpose of this phase concerning congenital and acquired (non-traumatic) variation was a generalized survey of the incidence, no attempt was made to review all cases of any given disorder. While many diseases were reviewed, this study cannot be considered complete, since other conditions associated with proximal tibiofibular disparity undoubtedly exist. The disorders having concomitant proximal tibiofibular abnormalities are discussed in the ensuing sections.

Physiologic Hypermobility (Idiopathic Subluxation)

Twelve cases were reviewed. All were intermittently symptomatic—lateral knee pain with excessive activity. Six patients had generalized ligamentous laxity, three patients had muscular dystrophy,
and one had Ehler’s-Danlos syndrome. Three patients (all over fifty-years-old) experienced peroneal nerve dysfunction. The fibular head could be displaced approximately one centimeter anteriorly, which duplicated the patients’ symptoms. Standard radiography appeared normal, while stress films showed anterior displacement. Several of these cases were described and illustrated in a previous publication [22], and will not be discussed further.

Relative Fibular Hypoplasia

Two cases, classified previously as intercalary fibular hemimelia, in actuality had shortening of the entire fibula relative to the tibia, with the hypoplasia being evident at both the proximal and distal ends. The overall contour of the fibula appeared normal, although shortened. One patient had a normal foot and mild valgus deformity at the ankle. The other patient had absence of the fifth ray and toe, a ball-and-socket joint, and a valgus deformity at the ankle, with the distal fibular and tibial growth plates being at the same level. In each case, the proximal fibula was about one centimeter more distal than normal and appeared to be articulating with the diaphysis, rather than a true joint. The proximal fibula was hypermobile.

Fig. 1A–C. Hyperplasia of the proximal fibula in a girl with congenital hyperextension of the knees. A 4 months of age. B 9 years. C 20 years. The abnormal proximal tibiofibular relationship was evident at 4 months