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Genu Valgum After Proximal Metaphseal Fractures In Children — A Report of 2 Cases

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SUMMARY

Bassey LO. Genu Valgum After Proximal Methaphyseal Fractures in Children – a Report of 2 Cases. *Nigerian Journal of Paediatrics*, 1990; 17:65. Two cases of valgus deformity of the tibia following proximal metaphyseal fractures in childhood are described. They involved a 4-year old girl and a 16-year old male. The fractures were sustained at the ages 8 months and 8 years respectively. Management in each case involved the use of corrective osteotomy but with recurrence of the deformity in the 4-year old child. A revision of the Pes Anserinus tendon plate and suturing of same was considered the mainstay of eventual successful treatment. The pathomechanism of the deformity is discussed in terms of the "rein check" theory with review of literature. It is suggested that all cases of proximal methaphyseal fractures in children should be managed primarily by revision of the Pes Anserinus Tendon plate and suturing in order to avoid later corrections by osteotomies.

INTRODUCTION

THE development of valgus deformity after a simple fracture of the proximal tibial metaphysis in children despite initial adequate conservative management and corrective osteotomies, constitutes a rare and interesting form of childhood injury. The first description of the deformity has been attributed to Cozen[1] and although several theories have been put forward, the pathomechanism of the deformity still remains unclear and a subject of controversy.[2]

The cases reported here were seen and treated in the Orthopaedic Unit of the Department of Surgery of the University of Calabar Teaching Hospital, Calabar. The clinical findings and management of the cases are presented with regard to the postulation of soft tissue interposition into the fracture space leading to an imbalance of the normal stabilizing forces in the lower limb as proposed by Weber in the "rein check" theory.[3,4]

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CASE REPORTS

Case 1:

NO, an 8-month old female child sustained a proximal metaphyseal fracture of the left tibia and was treated conservatively using a plaster of paris cast (Fig 1). She presented again at the age of 2 years with a very bizzare valgus deformity with an angle of deviation of 20° and 1.5cm length discrepancy. The deformity was corrected by osteotomy of the tibia and the child was discharged with what was considered a satisfactory result. She presented again five months later, with a recurrence which was the impetus for reconsideration of our management and also to postulate a pes-anserinus periosteal tendon plate involvement. In a second surgical procedure, the pes anserinus tendon plate was explored, and to our amazement, we discovered a fibrocartilaginous soft tissue reaction of the tendon plate.

The area was revised and the periosteum raffed by suturing with chromic catgut. Plaster casts were applied for the next 6 weeks, each cast being renewed at two weeks interval, in an attempt to correct the deformity. The case was observed for a further one year. Improvement took place with no evidence of further recurrence even after two years. Thi child is now four years old (Fig. 2).

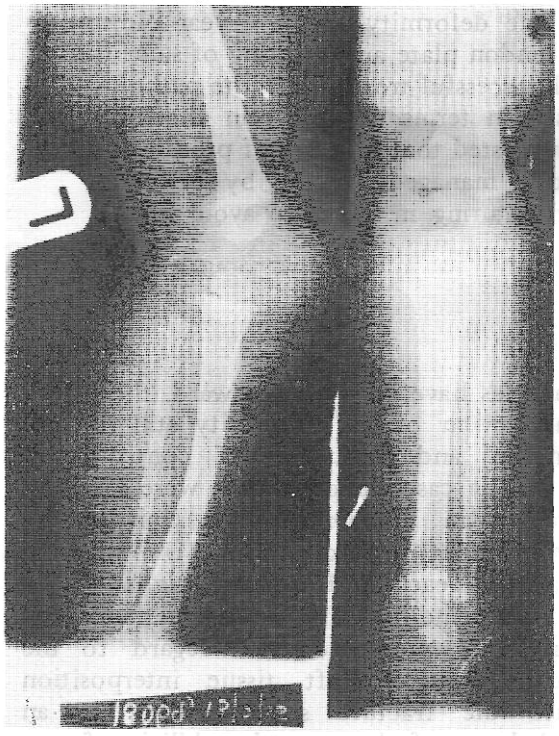

Fig. 1: X-ray of the original metaphseal fracture of the left proximal tibia at the age of one. (Case I).

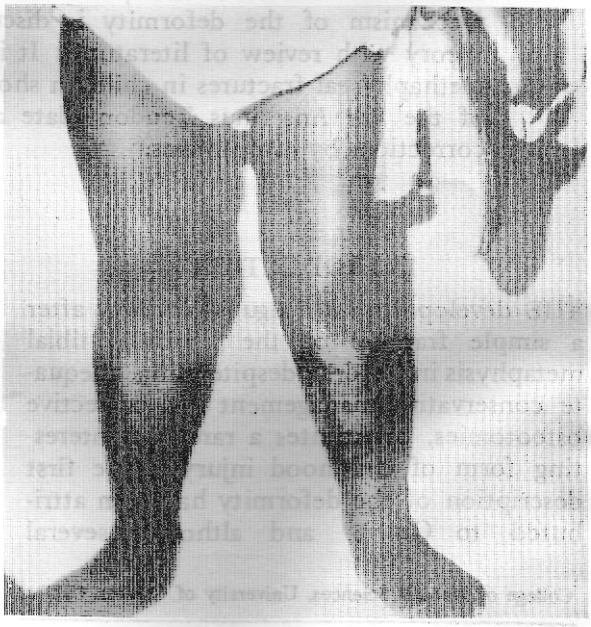

Fig. 2: Photograph showing the limbs at the age of our with correction of the left valgus deformity. (Case 1)

Case 2:

A 16 years old Nigerian boy presented with a very bizzare valgus deformity of the right tibia and an angle of deviation of 42°. The tibia had assumed an S-form shape due to compensatory reaction of lower tibial epiphysis. He was reported to have sustained a proximal tibial fracture at the age of eight and we can only conjecture from the late radiological findings (Fig 3) that the deformity was due to a proximal metaphyseal fracture. He was initially treated for the fracture in his village by a traditional "bone setter". Our management for the case was by distal femoral and proximal tibial osteotomy and stabilization by means of plate – osteosynthesis. The result obtained was gratifying and there has been no evidence of recurrence even at 1 year after the corrective osteotomy.

Fig. 3. X-ray of gross valgus deformity of the right tibia in case 2

DISCUSSION

Some of the proposals which have been put forward to explain the pathomechnism of valgus deformities following proximal metaphyseal fractures are:

(i) malalignment of the original fracture
(ii) inhibitory factor of the lateral tibial growth by the fibula
(iii) fracture callus that is capable of interstitial growth
(iv) increased overgrowth of the medial part of the tibia due to hyperaemia medially
(v) soft tissue interposition leading to an imbalance of the normal stabilizing forces in the lower limb[3 4]
(vi) Assymetrical overgrowth of the medial part of the tibia due to release of the mechanical restraint on that part of the tibia

Each of the theoretical postulates above appears plausible, although the most significant of these and with clinical relevance, is that put forward by Weber.[4] Weber found out that in the cases of these fractures that were surgically managed, the Pes Anserinus tendon plate was ruptured and interposed into the fracture space, and the removal of this soft tissue interposition and refixation by suturing resulted in normal union of the fracture (without valgus deformity). From

the review of literature available to us, we are not aware of any case of this rare childhood injury having ever been reported in the West African sub-region. We must also admit that our first line of thought which led to our management of the first case was guided by a misconception of the pathomechanism or pathoaetiology of the deformity. We thought that the deformity was the result of an over-growth of the left tibia due to excessive irritation of the periosteum and epiphyseal growth plate, as can occur in any childhood fracture, and that this was further complicated by an antero-medial complex knee joint instability. Thus, corrective osteotomy and immobilization in a plaster cast was considered adequate treatment.

Zionts and MacEwen[6] have by their extensive study of this ailment been able to confirm this overgrowth, which makes our initial misconception appear less aggravating than would have been the case.

Despite contrary opinions especially with reference to the latest report by Broughham and Nicol[7] we tend to support the "check rein theory" of Weber.[4] In doing so the report by Potthoff[5] in which revision and suturing of the Pes Anserinus tendon plate was carried out and resulted in prevention of the deformity is taken into consideration. It is also significant that Broughham and Nicol did establish a rupture of the periosteal tendon plate sheath as described by Weber.[4] The development of late valgus deformity in their cases could be ascribed to failure to resuture the periosteal tendon sheath. This omission was noted in their report and could possibly be the cause of failure.

The report on three cases by Bell et al of varus deformities due to fibrocartilagenous dysplasia of the Pes Anserinus plate is also indicative of the role of this tendon plate as a cause of deformities of the tibia. This finding and the cases just described, in this report would tend to support Weber's postulation. Zionts and MacEwen[6] have stressed the possibility of spontaneous correction which could have accounted for the result we obtained (non-recurrence). This is disputable. In the second case described in this report, it appears that this spontaneous correction did not take place due to the fact that the angle of deviation was more than 15^{o} as reported by Zionts and MacEwen.[6]

In conclusion we will like to suggest that the rupture of the Pes Anserinus tendon plate with soft tissue interposition is the cause of this childhood deformity due to loss of tethering effect on the medial part of the tibia, and therefore the management of proximal metaphyseal fractures in childhood should be treated primarily by surgery to remove the soft tissue interposition and resuture the Pes Anserinus tendon plate.

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