CONGENITAL POSTERIOR BOWING OF THE TIBIA WITH TALIPES CALCANEO-VALGUS

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The purpose of this paper is to distinguish three types of congenital bowing of the tibia and to support the view of Heyman and Herndon (1949) that posterior bowing, although comparatively rare, is nevertheless a clinical entity. These observers clearly described the condition and rated its prognosis as more favourable than that of the two types previously described in the literature. A review of this literature is interesting. In 1925 Ollershaw, writing on "Congenital Defects of the Long Bones of the Lower Limb," made a casual reference to forward bending of the tibia as an occasional finding. In 1934 Middleton described anterior bowing of the middle and distal thirds of the diaphysis, the presence of an extreme and fixed talipes equinus, the shortness and thinness of the lower limb as a whole, the puckered depression in the skin over the salient angle of the tibial deformity and the frequent presence of other developmental anomalies. He differentiated this type of congenital bowing from the one associated with pseudarthrosis occurring usually at the same site. Freund (1936) described a number of cases similar to Middleton's, and stressed the association of other congenital defects, particularly absence or deficiency of the fibula. In 1943 Williams clearly differentiated two types of congenital anterior bowing, in an article entitled "Two Congenital Deformities of the Tibia, Congenital Angulation and Congenital Pseudarthrosis." He pointed out that in cases of so-called congenital pseudarthrosis the tibia may be intact at birth and that in these cases there is no talipes equinus and there are no associated developmental faults. Boyd in 1941 wrote: "The prevalence of pseudarthrosis following osteotomy in cases of congenital bowing of the tibia and the extreme difficulty of securing union following such a pseudarthrosis suggest that the etiology in congenital pseudarthrosis and congenital bowing of the tibia may be related."

It seems advisable, in order to avoid ambiguity, to recognise the two types of anterior bowing and not to use the term congenital pseudarthrosis to cover both of them. When there is no associated foot deformity or other congenital anomaly, tibial bowing is almost invariably the precursor of pseudarthrosis (Fig. 1). For instance, in Camurati's (1930) series of twenty-seven cases of pseudarthrosis of the tibia, only four were shown with the tibia still intact, and in all four the bowing was anterior. Similarly in Wade's (1928) series of ten cases of congenital pseudarthrosis there were four in which the tibia, though initially...
intact, was bowed forwards before the seemingly inevitable fracture and pseudoarthrosis developed.

It has become clear that besides the two types of congenital tibial bowing already mentioned there is also a third, less common, type, in which the convexity of the bowing is posterior and medial and there is an accompanying talipes calcaneo-valgus so pronounced that the foot seems to nestle in the concavity of the tibia. From time to time isolated cases of this condition have been presented. Denis Browne published a photograph of one case in 1936, and Freund showed radiographs of another in 1936; Bordeu described the condition in 1943, and in April 1949 Dawson published a typical case under the title of "Intra-uterine Fracture of the Tibia and Fibula." Lastly, in July 1949, Heyman and Herndon published their observations. These are confirmed by my own experience, which is illustrated in the following five case records.

**CASE REPORTS**

**Case 1**—K. L., a girl, aged five months, seen at the Orthopaedic Hospital, Stoke on Trent. Marked posterior bowing of the right tibia with accompanying severe talipes calcaneo-valgus had been observed at birth, but no treatment given. Radiographs confirmed posterior and medial bowing at the junction of the middle and lower thirds of the right tibia and fibula (Fig. 2). The calcaneo-valgus deformity responded quickly to manipulation and splinting; the bowing of the leg was treated by repeated moulding and fixation in plaster (Fig. 3). At the end of twelve months the posterior bowing was well corrected but there was still some medial bowing, and half an inch of real shortening was observed. Splinting was continued at night only, and normal activities were allowed in the day-time. During later observation there was delayed growth in the right leg, although the epiphyses appeared normal. When the child was twelve years old the right foot was smaller than the left and showed slight cavus deformity; there was three-quarters of an inch of real shortening of the right leg, with one-quarter of an inch of wasting of the right thigh, and one inch of wasting of the right calf (Fig. 4); many small café-au-lait spots were also found, mostly on the left forearm.

![Fig. 2](image_url)

**Case 1**—Condition when the child was first seen, at the age of four and a half months. Note the posterior and medial bowing. Calcaneus deformity is obvious although the foot is being forcibly plantar-flexed.
bowing is less apparent, but the medial element is still prominent.

Case 1—Radiographs at twelve years. Posterior and medial bowing of the right leg have almost disappeared, but growth has been deficient. Normal left leg is shown for comparison.
Case 2—S. I., a girl, aged sixteen days, with posterior and medial bowing of the right tibia and fibula and marked talipes calcaneo-valgus. Treatment was the same as for Case 1. Seven months later the position of the foot was good, and bowing of the leg was responding well to treatment (Fig. 5). At five years, four months, the child walked well with no instability or obvious deformity, but the leg was short.

Case 3—G. F., a boy, aged five weeks, with backward bowing of the lower third of the left leg. Calcaneo-valgus was marked, and the foot fitted neatly into the depression caused by bowing. The skin was dimpled over the site of maximum convexity. There was no pseudarthrosis and no congenital anomaly. Treatment was manipulative moulding and retention in plaster. Seven months later he was much improved, but there was still some posterior bowing (Fig. 6).
Case 4—M. T., a girl, newly born, an apparently white child of a coloured mother. The right lower leg presented postero-medial bowing; the foot, in a position of pronounced calcaneo-valgus, lay in the concavity. After four months' treatment, bowing was still present but the right leg was half an inch short (Fig. 7). At the age of two years and ten months there was still some obvious bowing; the shortening had remained the same, and there was a slight limp.

Case 5—D. E., a girl, aged three weeks when first seen by Mr Roaf in Liverpool. There was marked calcaneus deformity of the foot and posterior angulation of the lower third of the leg. Radiographs confirmed the clinical findings and showed "buttressing" of the concavity of
the tibial curve (Fig. 8). Initial treatment was manipulative moulding of the foot and retention in anterior plaster shell. Mr Roaf has reported the calcaneus deformity to be well corrected within three months, and bowing of the tibia to be greatly improved but still present when the child was last examined at the age of eighteen months (Fig. 9). There was just over half an inch of shortening.

DISCUSSION

These five cases support the view of Heyman and Herndon (1949) that congenital posterior angulation of the tibia, associated with talipes calcaneo-valgus, must be considered as a distinct clinical entity. In all the cases the calcaneo-valgus deformity was fully corrected without difficulty. The posterior angulation has also responded well to gentle moulding and fixation in plaster at monthly intervals. The medial bowing, on the contrary, has been more resistant to correction. All five cases showed a moderate impairment of growth in the affected leg. We have no evidence to indicate the natural course of the deformity if left uncorrected; nor do we know with certainty what would be the probable outcome after fracture or after osteotomy for correction of the deformity. But the analogy to anterior bowing, with its tendency to pseudarthrosis, is sufficient to demand a cautious attitude to surgical treatment.

SUMMARY

1. The literature dealing with congenital bowing of the tibia has been reviewed, and three types of deformity have been distinguished.
2. Five examples of the third type, in which the bowing is posterior and medial, are presented.
3. The characteristic features of the clinical entity are described, and the satisfactory response to conservative treatment is illustrated.

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REFERENCES


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