DELTA PHALANX

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This term is suggested to describe a rare deformity, usually occurring in the middle phalanx of a finger, in which the bone is triangular in shape and has a continuous epiphysis running from the proximal to the distal end along the shortened side. Figure 1 shows the severe angular deformity of the finger and the continuous epiphysis. Growth in such a phalanx can only occur outwards and the angulation persists with little or no gain in length. At an earlier stage of development, before the epiphysis is ossified, it may not be apparent in radiographs that there is cartilage uniting both proximal and distal articular surfaces along the contracted side, but exploration of the lesion has shown this to be present in all the six fingers treated. It should be made clear at this point that this lesion is different from the simple angular deformity of a phalanx often seen as a familial condition in the little finger.

Five cases of delta phalanx have been seen, all in boys, in one of whom two fingers were involved. In no instance was there any family history of deformity. Other abnormalities were seen in four of the cases—syndactyly in two, congenital angulation of the tibia in one, supernumerary thumbs in the other. In the fifth, only the little finger of one hand was abnormal.

TREATMENT

Corrective splintage in infancy was attempted in two cases but was abandoned after the first year as there was no improvement. It seemed logical to attempt division of the continuous
epiphysis by osteotomy of the phalanx and to open up a wedge on the contracted side into which a bone graft could be inserted. This has been done on all six fingers, but the amount of correction obtained at the first operation was disappointing. The limiting factor is tightness of all the soft tissues, and Z-plasty of the skin does little to help. However, it was observed later that after division of the epiphysis the phalanx began to grow, and this made possible a second operation a few years later with greater correction. In one finger a simple division of the epiphysis was carried out without osteotomy of the phalanx; growth in length occurred later but without any improvement in the angular deformity. It is recommended, therefore, that delta phalanx should be treated by division of the continuous epiphysis, osteotomy of the phalanx and insertion of a bone graft as soon as the size of the finger makes this technically possible. Growth of the finger should then be watched for five or more years before performing a second similar osteotomy with insertion of another graft to obtain better correction.

ILLUSTRATIVE CASES

Case 1—A boy of six had syndactyly of all four fingers of the left hand and angular deformity of the index and little fingers in the middle phalanx (Fig. 1). He had no other abnormality and no family history of congenital defects. The syndactyly was separated in two stages and a few months later osteotomy of the middle phalanges of the index and little fingers was done as described above. Figure 2 shows the index finger a month after correction and Figure 3 the appearance five years later. Further osteotomy was advised but refused by the parents because the function was excellent.

![Figure 1](image1.png)

**Case 2**—A boy was seen within a few days of birth with congenital angulation of the left tibia, a supernumerary left hallux and an angular deformity of the left index finger (Fig. 4). Osteotomy and grafting of the proximal phalanx was carried out at the age of three and a half and repeated at the age of seven (Figs. 5 and 6). At the age of ten the finger had excellent function and only 15 degrees of radial deviation (Fig. 7).
Case 3—A boy with an isolated deformity of the left little finger was treated by osteotomy with insertion of a graft from the ulna at three and a half and at eight years of age. Figures 8 and 9 show the condition at the beginning and the end of treatment.

SUMMARY AND CONCLUSIONS

1. Delta phalanx is a rare congenital abnormality not to be confused with other forms of angular deformity of the phalanges.
2. The deformity needs radical treatment by repeated surgery because there is no tendency to spontaneous correction and growth of the phalanx is prevented by the epiphysial deformity.