

Introduction

Polydactyly is one of the most common inherited congenital deformities. It occurs in 1.7 cases per 1000 births and comprises 45% of congenital abnormalities in the foot. There are numerous variations of polydactyly in the foot which can be classified into groups consisting of preaxial, central, and postaxial. Each surgical case of polydactyly has to be planned on an individual basis as the anatomy of the deformity is complex and variable. This case study highlights a rare instance of bilateral preaxial polydactyly of the hallux with rigid malleus deformity surgically treated in an adolescent patient.

Case Study

A 12 year old presented to clinic with his family complaining of a painful hallux bilaterally. The patient was born with a deformity to his big toes. Over a few years now his hallux have continued to worsen causing more pain, difficulty walking, and prevent him from pushing off the big toe normally on both feet. His father was concerned that this issue could prevent him from entering the military or pursuing other professional options. Clinical examination revealed an excessively large hallux bilaterally with duplication of nail plate with a central furrow (Figure 1).



Figure 1: Clinical appearance of pre-axial polydactyly with hallux nail duplication. (a) Left foot. (b) Right foot. (c) Rigid malleus deformity at interphalangeal joint (IPJ) hallux bilaterally.

Limitation of interphalangeal joint (IPJ) motion was noted with a fixed malleus contracture bilaterally. X-ray imaging showed duplication of the hallux bilaterally (Figure 2). The diagnosis of preaxial polydactyly with rigid hallux malleus was discussed with patient and family. Once the benefits and complications were discussed, the patient and his family have elected for surgery.



Figure 2: X-rays of left (a) and right (b) feet showing preaxial polydactyly with duplication of the distal phalanx and a portion of the proximal phalanx of the hallux. Limited IPJ space noted bilaterally with incomplete joint formation. Surgical osteotomy plan outlined in orange.

Procedural Methodology

The procedure of choice was to resect the accessory hallux, fuse the IPJ, and reconstruct the hallux soft tissues starting with the right side followed by the left once healed from the first procedure (Figure 2.) The surgery was performed at Hancock Regional Medical Center in Greenville, IN by the authors.

The patient was placed in the supine position. Following IV sedation, a first ray mayo block was performed with 20cc of 2% lidocaine plain. An ankle tourniquet was applied. The foot was then scrubbed, prepped and draped in the usual aseptic manner. The right lower extremity was elevated for exsanguination and the tourniquet was inflated to 250mmHg. An elliptical incision to bone was made as described in Figure 3a. The accessory distal and proximal phalanx were removed and passed off from the operative site (Figure 3).

The IPJ was resected at an angle to straighten the hallux and prepare the joint site for fusion (Figure 3d). Fenestration was performed with a 2.0 drill bit. A guidewire was retrograde drilled through the distal phalanx and then into the proximal phalanx while holding the toe in a rectus position. Then using standard AO principles and techniques a cannulated headless compression screw was placed with excellent compression noted (Figure 3e). Subcutaneous closure was obtained with 4-0 monocryl. 4-0 prolene was used to obtain skin closure and used to suture the remaining nail plate to the lateral skin fold (Figure 3f). The tourniquet was released and a standard dressing was applied.

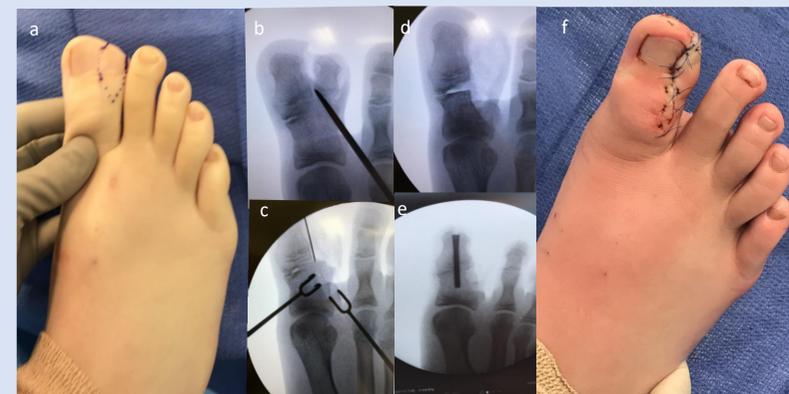


Figure 3: Right foot surgical correction of preaxial hallux polydactyly. (a) Incisional approach. (b) and (c) resection of accessory hallux. (d) IPJ hallux wedge resection. (e) IPJ hallux fusion. (f) Reconstructive closure.

The patient was discharged with instructions to remain partial weightbearing in a boot, RICE therapy with NSAIDs, and Norco 5/325 as needed with followup one week after the procedure. Sutures were removed at two weeks postop. The patient was transitioned into a normal tennis shoe at six weeks postop. Serial x-rays were performed at follow-up showing bony fusion at the IPJ right hallux in rectus position after six weeks. After healing the procedure on the right foot, the patient wished to have the same procedure on the left foot. The same procedure was performed using a similar technique and same postop course. At final follow-up visit, the patient was overall happy with the position of the big toe on both feet and glad he had the procedures performed (Figure 4).



Figure 4: Left (a) and right (b) foot postoperative clinical position appears rectus. Fusion across the IPJ hallux was noted on serial postoperative x-ray imaging.

Discussion

Although polydactyly is a relatively common congenital deformity, it is challenging to correct due to the variation in anatomic structures which makes each case unique and complicated. This case study highlights the importance of preoperative and perioperative planning to obtain the best outcome. The ideal surgical procedure should reflect the goal to restore normal cosmetic appearance and maintain overall function of the forefoot. In this case, the patient was very satisfied with the cosmetic and functional outcome of his procedures.

References

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