Synpolydactyly: Analysis of Classification and Treatment

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INTRODUCTION

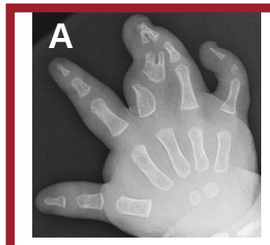
Synpolydactyly is a rare congenital anomaly characterized by syndactyly and polydactyly in the central hand. Few studies exist on clinical presentation, classification, and treatment of this complex condition. We aim to better characterize synpolydactyly hands and describe our evolution of management over the past 12 years.

MATERIALS AND METHODS

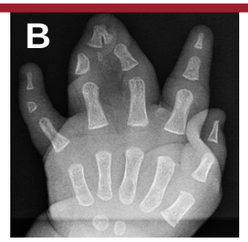
A retrospective chart review of synpolydactyly patients treated by two senior authors was conducted.

RESULTS

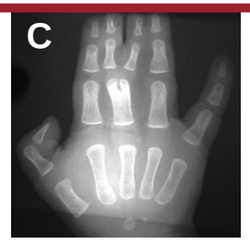
Ten patients with synpolydactyly were identified. Nine patients (90%) had bilateral involvement, which allowed analysis of 19 hands. The majority of hands (15/19) could be categorized according to the recently described classification by Wall et al. Of these, 7 hands had additional features such as 2nd or 4th webspace syndactyly or presence of delta phalanx in non-ring finger P1 (FIG. 1A-D). Some hands (4/19) could not be assigned a classification type either due to one hand having features of two classification types or not being able to tell where the duplication begins (FIG. 1E-H). Average number of surgeries for each patient was 2.1, with first surgery usually occurring between 7 and 12 months of age. In four patients, major complications developed consisting of flexion or angulation joint deformities in the digits (greater than 40 degrees). Three patients underwent reoperations to address these complications, including osteotomies or soft-tissue procedures with or without K-wire fixation. In order to mitigate these complications, we changed our approach to involve less aggressive removal of polydactylous components during the initial surgery. In a recent patient, an osteotomy was chosen instead to decrease the width of the digit and improve contour without completely removing the duplicated portion.



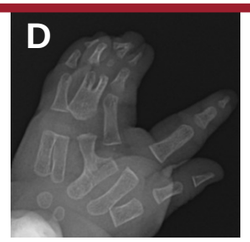
- Type 3
- MF P1 is a delta phalanx



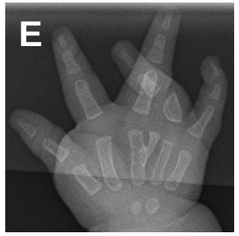
- Type 3
- RF P2 is a delta phalanx



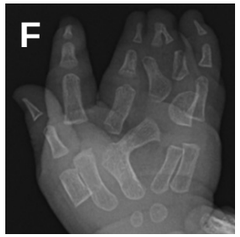
- Type 2B
- 2nd webspace syndactyly



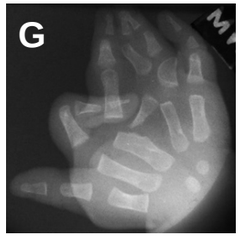
- Type 1A
- 4th webspace syndactyly



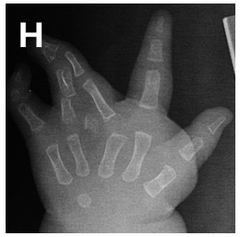
- Bifurcated MF metacarpal
- No phalangeal duplication
- RF P1 is a delta phalanx
- Mix of Type 1A and Type 2A



- Bifurcated MF metacarpal
- Phalangeal duplication
- RF P1 is a delta phalanx
- Mix of Type 1A and Type 2A
- 4th webspace syndactyly



- Is most proximal duplicated segment metacarpal or P1?
- RF P1 is a delta phalanx
- Type 1B or Type 2A?



- Is most proximal duplicated segment metacarpal or P1?
- Type 1B or Type 2B?

FIGURE 1 - MF=middle finger, RF=ring finger, P1=proximal phalanx, P2=middle phalanx. A-D) Representative examples of synpolydactyly hands that were assigned a Wall et al. classification type, but had additional features. E-H) Synpolydactyly hands that could not be assigned a classification type.

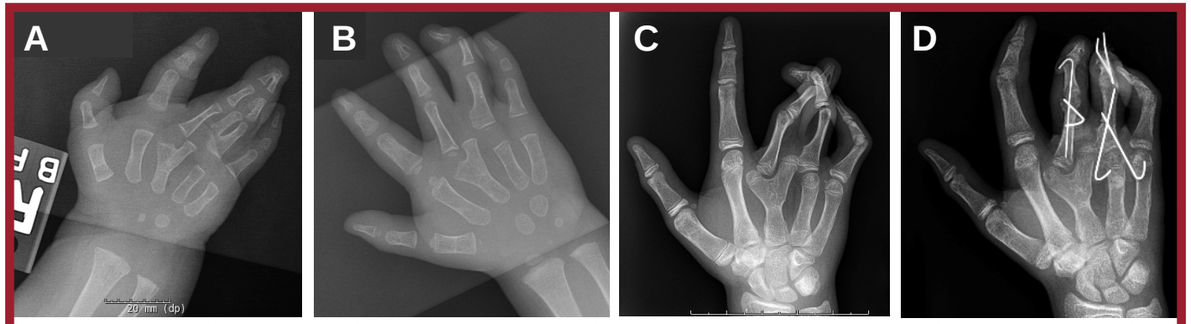


FIGURE 2 - Example of a synpolydactyly patient at our institution treated with a "more aggressive" approach regarding removal of polydactylous components. Patient had bilateral disease, but only right hand is shown here. A) Initial X-ray demonstrates synpolydactyly with duplicated metacarpal and phalanges in the 3rd web space. At 9 months of age, patient underwent syndactyly repair and removal of aberrant bones, including partial excision of duplicated metacarpal. B) At 3 years, patient developed ring finger (RF) distal interphalangeal (DIP) joint flexion contracture (60 degrees) and radial deviation (50 degrees), which was corrected by skin Z-plasty, DIP joint capsulotomy, and Z-lengthening of flexor tendon with K-wire fixation. C-D) At 12 years, patient represented with scissoring of long and ring fingers, and ultimately underwent osteotomies with K-wire fixation in both long and ring fingers.

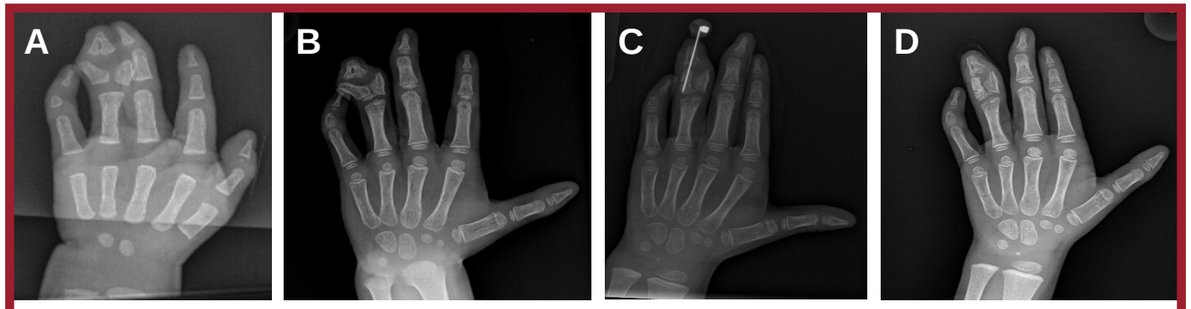


FIGURE 3 - Example of a synpolydactyly patient at our institution treated with a "less aggressive" approach regarding removal of polydactylous components. Patient had bilateral disease, but only left hand is shown here. A-B) Initial X-ray (A) demonstrates synpolydactyly with duplicated middle and distal phalanx in the ring finger. At 15 months of age, patient underwent syndactyly repair without any removal of duplicated bones (B). C) At 3 years, ring middle phalanx wedge osteotomy was performed to narrow the finger. D) Final appearance of the hand after wedge osteotomy and pin removal.

CONCLUSION

Synpolydactyly is a rare congenital hand anomaly with a significant degree of variability in clinical presentation. Following initial operation, complications are common, including joint flexion and angulation deformities in the digits. It is not clear at this time to what degree these complications can be prevented, and we currently favor less aggressive bony resection at the time of syndactyly repair in order to hopefully achieve greater joint stability in the long run. Long-term follow-up and more patients are needed for future study.