Analysis of Relevant Factors of Finger Body Deviation Following Thumb Duplication Resection in Children with Polydactyly

Jialun Allen Chi[1], You Qian[2], Jianguo Wang[2]
[1]University of Virginia, [2]Shanghai Ninth People's Hospital

INTRODUCTION:
Polydactyly is the most common congenital hand deformity, and its surgical treatment entails reconstruction of the anatomical structure as opposed to simple excision of redundant fingers. Due to the hand's complex anatomy, there is a high incidence of secondary deformities and dysfunction following thumb duplication surgery. We aim to explore the relevant factors of lateral deviation of the digit after operation in children with polydactyly deformity.
METHODS:
This group has 442 cases of unilateral compound thumb deformity (except floating thumb), 211 males and 231 females; aged 5 to 63 months, with an average of 23.7 months. According to Wassel classification: 85 cases of type II, 58 cases of type III, 148 cases of type IV (excluding type D), 115 cases of type IV-D, 20 cases of type V, and 16 cases of type VI. The axis of type II and type III thumb was measured based on the axis of proximal phalanx-distal phalanx, and the axis of thumb of type IV to VI was measured based on the axis of metacarpal bone-proximal phalanx. The outcome index was whether the angle of thumb axis was greater than 20 ° in the last follow-up. The independent variables were gender, age of operation, Wassel classification, incision design, tendon and ligament treatment, bone tissue correction and joint fixation time. The binary logistic regression model was used to perform univariate and multivariate analysis.
RESULTS:
The 442 children with compound thumb deformity in this group were followed up for 16 months to 7 years (mean, 49.8 months), and 53 patients had an angle of thumb axis greater than or equal to 20° after surgery. The highest incidence was Wassel type III (14/58) and type IV-D (25/115). Univariate and multivariate Logistic regression analysis showed that Wassel classification (95% CI: 1.102-5.133, P = 0.015), joint fixation time (95% CI: 0.761-4.453, P = 0.011), tendon and ligament treatment (95% CI: 0.761-4.453, P = 0.011) %CI: 1.107-3.261, P = 0.002) and bone tissue orthopedics (95% CI: 1.113-3.663, P = 0.004) were the main factors affecting the lateral deviation of the finger after surgery for children with compound hallux deformity (P < 0.05).
DISCUSSION AND CONCLUSION:
Wassel classification was related to the incidence of finger body deviation, with types III and IV-D having the highest incidence. During the operation, we must pay close attention to the reconstruction of tendon and ligament balance, select the treatment method for the bone and joint based on the X-ray, and individualize the joint fixation time to prevent postoperative finger body deviation.