

Functional and Aesthetic Outcome Evaluation for Toe to Hand Transplantation, Non-Vascular Phalangeal Transfer and Pollicization for Congenital Thumb Hypoplasias

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Introduction. Congenital thumb hypoplasia presents itself as patient's disability with lack of functions, poor cosmetics and significantly impacted quality of life in the future. Pollicization is a method of choice for Tonkins type IIIa, IIIb, IV and V. However, in some cases to preserve a five-digit hand and maintain its function, toe to hand transplantation is preferred. The main problem is stability of carpometacarpal (CMC) joint; there are no surgical techniques for toe to hand transplantation with CMC reconstruction.

Aim, Materials and Methods. A total of 6 patients were operated in the Microsurgery Centre of Latvia with thumb hypoplasia type IIIB and hand aplasia. New technique – Metasrophalangeal joint chondrodesis (arthrodesis) was used for toe to hand transplantation for thumb hypoplasia grade IIIB-V for 2 patients with hypoplasia grade IIIB and one patient with grade V. In the study, a surgical technique of transferred toe has been modified – metatarsophalangeal joint arthrodesis is performed to improve the length and stability of neo metacarpal. The PIP joint becomes an MCP joint and DIP joint becomes an IP joint. Also “pseudo” 1st CMC joint develops between the carpal bones and base of metatarsal. Follow up was done to investigate functional outcome. One patient had conventional pollicization, one patient had neovascular phalangeal transfer for metacarpal stabilization.

Results. Functionality for both evaluated thumbs was good DASH 8 and 10.7 for new toe to hand transplantation technique. For non-vascularized phalangeal transfer, DASH was 51.7. For patient with pollicization, DASH was 6 points out of 100. Grasp and pinch are possible with stable CMC joint for all patients. Thumb is much stiffer for non-vascular phalangeal transfer patient. Parents are very satisfied for the thumb reconstructed with toe to hand transplantation and pollicization VAS 0 and 2 points. Less satisfied patients were observed for the thumb with non-vascular phalangeal transfer VAS 7.

Conclusions. There are only a few articles which suggest microsurgical toe to hand transfers for type IIIb, IV and V due to technical difficulties and donor site morbidity. The point for new technique for thumb reconstruction with second toe transplantation and MTP arthrodesis was salvage of 5 digit hand and restoration functionality of the thumb. And it looks as if this method can be an alternative for the pollicization to reconstruct thumb hypoplasia grade IIIB-V. We think that MTP arthrodesis is an answer to stability and length of thumb. There are no doubts for CMC (carpometacarpal) stability without ligament reconstruction; it looks like paediatric patients can make stable pseudo joints. Stable thumb can be achieved even without trapezium bone. The results for 5 digit hand reconstruction in radialclub hand patients is very difficult to predict but in our case results are satisfied.