

Zanoli's procedure for overlapping fifth toe

Retrospective study of 18 cases followed for 4–17 years

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Digitus quintus superductus pedis (overlapping fifth toe) is a congenital deformity, often bilateral, in which the fifth toe is medially directed, rotated and hyperextended. There is no consensus regarding the best treatment. We describe our experience using Zanoli's procedure, which is a tenodesis procedure using the extensor tendon of the fifth toe. Between 1979 and 1993, we operated on 16 patients (7 bilateral, total 23 feet). 13 (10 women) patients (18 feet),

with a mean age of 26 (19–40) years, were seen on follow-up. The mean follow-up time was 8 (4–17) years. Pain relief was achieved in all patients. From the surgeon's point of view, 3 toes overcorrected due to technical errors were considered unsatisfactory. All patients, however, were satisfied with the result and would advise other patients to undergo the same operation.

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Digitus quintus superductus pedis (overlapping fifth toe) is a congenital deformity (Stracker 1929), often bilateral, in which the fifth toe is adducted, rotated and hyperextended (Figure 1). Besides shortening, flattening of the toe, phalangeal, and tendon or nail abnormalities may complete the clinical picture (Zanoli and Negri 1959).

Closed treatment and various types of surgical approaches have been advocated. We describe our experience with Zanoli's procedure.

Patients and methods

Between 1979 and 1993, 16 patients (7 bilateral, total 23 feet) were operated on by two surgeons. For this review, we were able to contact 13 (10 women) patients (18 feet), with a mean age of 26 (19–40) years at surgery. The mean follow-up time was 8 (4–17) years.

In 15 cases, patients had pain and in 10 functional disability. When the problem was only an esthetic one (3 of 18 in our series), we let the patient decide, after explaining to him or her the potential risks in the surgical treatment.

Radiographs of all feet were taken preoperatively. They confirmed the presence of the deformity, without any other congenital or acquired skeletal alteration.

Surgical technique

The original technique, as described by Zanoli and Negri (1959), was performed under general anesthesia, in order to use a tourniquet. This is nowadays possible also with regional block anesthesia and it is the only phase of the procedure we have modified (in the last 10 cases in this series). A dorsal longitudinal incision is made, starting from above the fifth tarso-metatarsal joint and running distally to the proximal interphalangeal joint (Figure 1). The distal insertions of the extensor and abductor of the fifth toe are exposed. The extensor tendon is cut transversely at the level of the tarso-metatarsal joint and its proximal stump is sutured onto the extensor tendon of the fourth digit (Figure 2). Manually holding the fifth toe in corrected position, a dorso-medial capsulotomy is performed: the toe should now remain in its normal position, without manual help. The distal end of the extensor tendon is then passed through a subcutaneous channel, starting from the medial aspect of the proximal phalanx, encircling its plantar surface in an oblique—proximal and lateral—direction, and then exiting on the lateral aspect of the metatarso-phalangeal joint. While maintaining the toe in a slightly overcorrected position, the tendon—applying abduction, rotation and plantar flexion—is sutured under tension onto the abductor muscle (Figure 3). Skin closure and plaster cast immobilization for one month are then performed in standard fashion (Figure 4).



Figure 1. Clinical presentation of the deformity and skin incision.

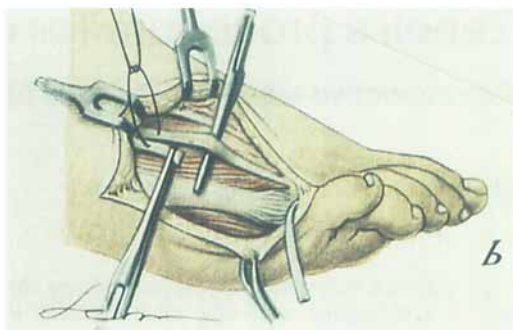


Figure 2. Isolation of the extensor tendons of the fourth and fifth toes. The latter is cut transversely at the level of the tarso-metatarsal joint and its proximal stump is sutured onto the former. (From Zanoli and Negri 1959, reprinted with permission).

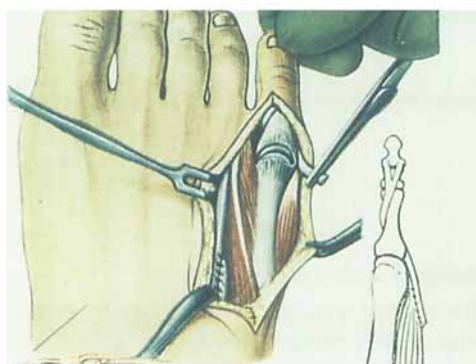


Figure 3. Applying abduction, rotation and plantar-flexion, the transposed tendon is sutured under tension onto the abductor muscle. (From Zanoli and Negri 1959, reprinted with permission).



Figure 4. Skin closure and postoperative result.

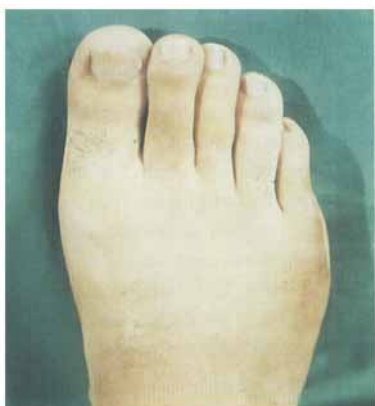


Figure 5. 13-year-follow-up of another case.

Follow-up examination

All the patients were physically examined. The correction of the deformity, pain relief, scar formation, toe function and the patients' opinions were recorded.

Results

Of the 18 feet, 10 showed a good correction (Figure 5), 5 were slightly overcorrected and 3 overcorrected. No recurrence was observed. From the surgeon's point of view, the 3 overcorrected toes were unsatisfactory. All patients, however, were satisfied with the result and would advise other patients to undergo the same operation. 8 patients had no cheloids, callosities or functional limitation. 10 patients presented ugly scars. In 5 cases this was associated with a callosity on the 5th toe, due to overcorrection (3 overcorrected + 2 slightly overcorrected toes). The 3 overcorrected toes also presented functional limitation when range of motion was tested, of no clinical significance. Pain relief was achieved in all patients. No one complained of paresthesia in the operated toe.

Discussion

Although De Boeck (1993) states there is no tendency towards spontaneous correction of an overlapping

fifth toe, Tawil et al. (1992) reported spontaneous correction in some children when they started to walk. The natural history of this affection is benign, since half of the patients will never complain (Scrase 1954). In fact, most of the operated patients decide on surgery for cosmetic reasons (Dini and Scarfi 1984). But some patients have pain (Ebbinghaus 1914), especially women who wear high-heeled shoes with narrow toe boxes (Reinherz 1991).

We disagree with authors who state that surgical treatment is the only effective one (Tawil et al. 1992, De Boeck 1993). Closed treatment (adhesive tape splinting) may prevent symptoms and defer the time for surgery, especially in childhood (Jordan and Caselli 1978).

The youngest patient in our series was 19 years old. So far as we know, there is no indication that an earlier correction could change the prognosis. We do not recommend this procedure for patients under 18 years of age. There are more than 40 different reported surgical techniques, indicating that none is totally satisfactory. To our knowledge, no prospective studies have been performed to compare different techniques. Reviewing the last 10 years' literature, there is a slight preference for skin-plasty procedures. From a theoretical point of view, only tenodeses achieve a three-dimensional correction of the deformity, without damage to bone.

Zanoli and Negri (1959) reported 4 cases treated by his tenodesis technique, with a short follow-up and good results. Since then, many foot surgeons in Italy have adopted this approach, and some of them have reported their results. Caruso and Dimiccoli (1965) operated on 20 cases (follow-up not indicated) and reported 15 good results out of 15, when they performed a tenodesis; Del Borrello et al. (1988) reported 11 cases (mean follow-up 9 years, range 1-18) with only 1 unsatisfactory result in a patient who had already been operated on with a different technique.

Number of patients, female/male ratio, percentage of "lost to follow-up" patients in our study, are comparable to other recent studies (Träger 1984, Black et al. 1985, Paton 1990, Tawil 1992, De Boeck 1993). Our follow-up is longer than in most other studies. Different indications and rating systems make results very difficult to compare. We believe that the patient's

opinion is of greater interest than simple evaluation of clinical parameters, since an ugly but painless scar can be, for example, a satisfactory result for a symptomatic patient, but a very disappointing one for a young girl who came to us with a slight painless "cosmetic" deformity.

Even if we assume that all 3 patients who did not attend the follow-up examination were dissatisfied with the outcome, we still have a lower failure rate than most other studies. Therefore, besides its theoretical advantages, this procedure has proved in our hands to have a long-term efficacy and a low failure rate.

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