



Flexor digitorum brevis (FDB) transfer (Pisani technique) in correcting metatarso-phalangeal joint (MtPj) instability of the second toe

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Summary

Introduction. The plantar plate stabilizes the lesser toes via the plantar fascia and the reverse windlass mechanism. The maintenance of intrinsic and extrinsic muscle balance of the toe is mandatory.

Surgical Technique. Patient is positioned supine with Trendelenbourg for plantar approach.

Material and method. We report in a prospective study the results of eight patients first evaluated after 6 month FU (10) and a second. Evaluation after 3 years FU is going on.

Results. Pre operative AOFAS scores (for lesser rays) mean 42 (14-65). At 6months FU there were mean 89 (75-100).

Discussion. The FDL transfer is known to lead to residual stiffness that appeared to be the source of the mild residual pain and cause patient dissatisfaction. There is also a potential complications such as the loss of strong toe grasp.

Conclusion. The FDB transfer is technically more demanding than FDL transfert because the little diameter of the tendon arms, but is a logical procedure using an intrinsic muscle.

Key words: instability of the second toe, flexor digitorum brevis transfer

INTRODUCTION

The plantar plate stabilizes the lesser toes via the plantar fascia and the reverse windlass mechanism. The maintenance of intrinsic and extrinsic muscle balance of the toe is mandatory.

Degeneration and rupture of plantar plate and collateral ligament, most commonly occurs at the second metatarsophalangeal joint.

The etiology of this degenerative disease is still not well known but generally related to chronic synovitis and instability and if it could be resolute with medical treatment in some cases, it is generally evolutive. It can occur isolately or in association with others fore foot pathology (cross-over toe, toes deformities, hallux valgus, Morton syndrome...)

A simple test in physical examination, the „positive Lachman” of the metatarsophalangeal joint (1) is useful for the diagnosis.

If there is a toe subluxation/ dislocation. The reduction of the digit at the MTPJ with a push-up test is the strongest diagnostic predictor of postsurgical outcome. Reductible :plantar plate repair is possible. A semireducible MTPJ generally need additional procedures.

Flexor digitorum longus (FDL) to extensor transfer is popular and used to treat painful metatarsophalangeal joint instability (2-3).

But if „Flexor tendon transfers have been found to successfully stabilize the unstable MTPJ but are criticized for causing stiffness and prolonged swelling”, (4) „The flexor tendon transfer remains an important procedure in correction of second toe instability but must be used with a full understanding of potential complications and patient dissatisfaction”.(5)

The FDB transfert for restoring the intrinsic function of the toe was described by G Pisani in 1993.(6-7)

It is now recognised as a good alternative procedure, and the main advantage of which is the preservation of the distal active support of the toes (because the FDL is intact) (8).

As it was advocated by Cracchiolo (9):the transfert may not, however restore a normal alignment of the

second toe. Correction of other forefoot deformities as hallux valgus and hammertoes may also be important in restoring metatarsophalangeal stability.

SURGICAL TECHNIQUE

Patient is positioned supine with Trendelenbourg for plantar approach.

Under loco-regional anesthesia, with ankle sterile pneumatic tourniquet (250mmHG).

A V shaped incision is done at the plantar aspect with the tip at the middle part of P2 and the branches divergent toward the MTPJ. A tread holds the tip of the skin retracted downward by the weight of a clamp.

Once through the skin, sharp dissection is carried down to the plantar aspect of the MTPJ. The neurovascular structures are in the intermetatarsal space and are easily avoided with this approach.

Straight on, the tendon sheath of the long and short flexors is the first structure encountered. It is linearly incised, exposing the flexor tendons. The FDL is retracted with a hook and atrenatively the two divided arms of the FDB are isolated and then released from their insertion into the second phalanx . They are then secured on a thread in a strong lasso mode suture because their thin diameter. With thin hemostat and after having divided by divergent traction carefully, the two tendonarms are pushed dorsally between the first phalanx and its periostum in the proximal third.

At the dorsal aspect where the hemostat is then feled, a vertical 0.5-cm incision is then made in order to pull the two arms of the FDB. The toe is reduced in plantar flexion, the the two arms of the FDB are pulled-up and sutured closed together over the extensor tendon with the toe kept in approximately 20° of plantar flexion at the metatarsophalangeal joint.

The flexor tendon sheath which was not fully opened at the plantar plate level is typically not reapproximated to avoid stenosis in our practice a peace of autologus PRF is putted in before the skin suture. A control xray is done.

The postoperative course involves a medication in a strapping mode to keep the toe slightly plantar flexed. A moulded sole cast is made for three weeks and generally weight bearing allowed immediately with crutches.

Medication and a control xray is done after a week.

MATERIAL AND METHOD

We report in a prospective study the results of eight patients first evaluated after 6 month FU (10) and a second. Evaluation after 3 years FU is going on.

There were 6 females and one male, with mean age 57Y (50-67), one bilateral that is 9 feet (5 left side, 4 right side), 3 cases were fore foot revision surgery for recurrence of hallux valgus and second ray decompensation with painful MtPj.

A positive drawer sign pathognomonic of early second metatarsophalangeal joint instability was present in all the patients and there were no luxation.



The feet morphotypes where 5 index minus, 2 index plus minus and 2 index plus. The metatarsal parabola were harmonious in 5 cases among them 3 index minus, one index plus and one index plus minus.

Others were M2 long (index minus) and one M2M3 long (index plus minus) , and 2 hypoplasia 45 M2M3 long (1 index plus and 1 index minus).

The Silfverskiöld test revealed that gastrocnemius muscles were retracted in 3 cases, non compliant in 3 cases (5° ankle dorsal flexion with extended knee), and normal in 3 cases.

Correction of other forefoot deformities were done in the same time: 6 scarf and Akin osteotomy for correction HV, 11 Weil osteotomy (one M2, one M2M3, and two cases M2M3M4M5), one P2 shortening of a too long second toe.

RESULTS

Pre operative AOFAS scores (for lesser rays) mean 42 (14-65). At 6months FU there were mean 89 (75-100).

DISCUSSION

The FDL transfer is known to lead to residual stiffness that appeared to be the source of the mild residual pain

and cause patient dissatisfaction. There is also a potential complications such as the loss of strong toe grasp.

The FDB as intrinsic muscle of the foot with some attachment on the plantar aponeurosis its use to stabilise the MtPj seems logical , an above all this transfert do not impair the FDL function for distal support of the toe. The tensionning of the transfert is independant from the ankle position and movements.

Correction of other forefoot deformities as hallux valgus and hammertoes may also be important in restoring metatarsophalangeal stability. It could be technically demanding.

Result at 6 month suggest that most of the recovery after surgery occurs (10).

CONCLUSION

The FDB transfer is technically more demanding than FDL transfert because the little diameter of the tendon arms, but is a logical procedure using an intrinsic muscle.

Transfer of the FDB tendon leaves the action of the FDL tendon intact, so that the patient does not loose the capacity for plantarflexion of the DIPJ that contributes to the maintenance of balance and harmony of the fore-foot.

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