

Plantar Lapidus

1st Tarsometatarsal Joint Arthrodesis
with MetaFix™ Plantar BG10

- **Tension Side Locking Plate**
Closing TMT1 under Load
- **Early Load-Bearing**
In Walking Boot
- **Reduced Non-Union Rates**
Compared to Dorsomedial
Locking Plates
- **Less Hardware Irritation**
No Nerve Interference and
Covered by Muscle

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to launch the surgical video.



BACKGROUND

Common metatarsal osteotomies frequently fail to address frontal plane rotations in hallux abducto valgus (HAV) deformities. Arthrodesis of the first tarsometatarsal joint (TMT1) reduces pathologic angles in the anatomic center of rotation of angulation (CORA) and allows a means of complete correction in all three planes. However, the optimal fixation method remains controversial since prevailing dorsomedial locking plates can be irritating to overlying soft tissues, elevate non-union rates and require several guided steps that mandate extensive and costly instrumentation.

The MetaFix™ Plantar BG10 locking plate facilitates early load bearing and lowers non-union rates as a result of the stable, plantar tension-band fixation and resulting loading and dorsal compression of the fusion site effectively stimulating bone healing. Additionally, the implant is situated on the foot under the abductor hallucis far from the nerves and thin skin of the dorsal side which reduces the risk of irritation and costly implant removal. The medial incision hides the scar. We ask you to continue to read and learn more about the procedure and results.

SURGERY TECHNIQUE

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Fig. 1 A medial incision along the first ray allows adequate exposure to perform a lateral release and a subsequent TMT1 capsulotomy that mobilizes the fragments. The HAV deformity is then reduced and de-rotated through a midshaft K-wire that is manipulated to reduce pathologic angles and plantarize the sesamoids under fluoroscopy. Next, the desired correction is provisionally fixated before TMT1 is resected. Subsequently, a temporary K-Wire is advanced dorsally through the fragments to guide a compression screw into the fusion site. The tension-side plate is then fitted to the plantar anatomy before it is fixated with locking screws. The corrected position and appropriate reconstruction are validated prior to wound irrigation and closure in layers. Post-operatively, patients are allowed to immediately weight-bear in a mono-valved cast, as tolerated.

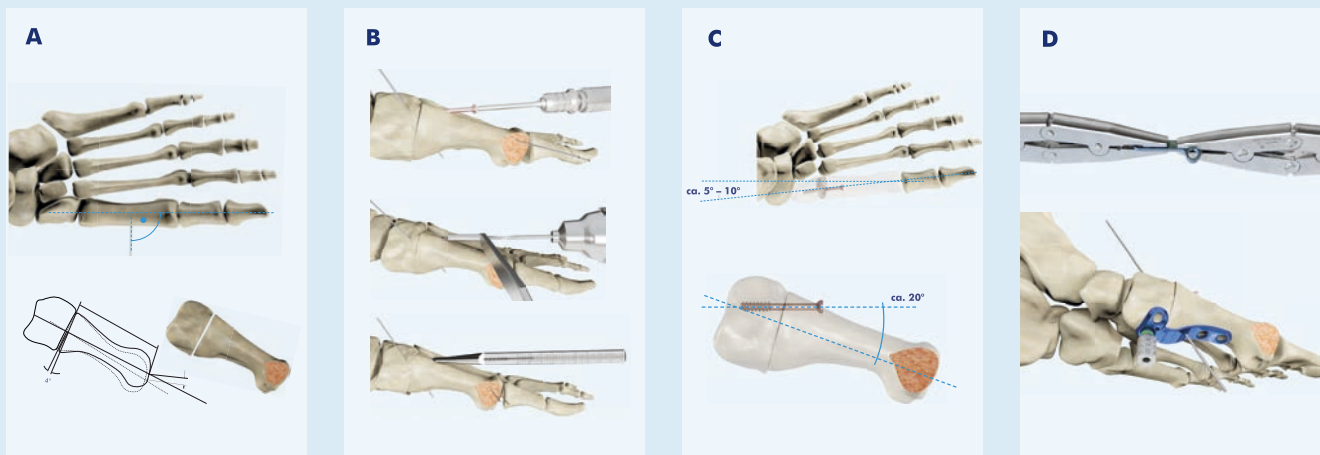


Figure 1: TMT1 Fusion with MetaFix™ Plantar BG10

- A** Reduction of the deformity with a midshaft K-wire prior to resection of TMT1
- B** Dorsal guide wire insertion
- C** Joint compression with a partially threaded screw
- D** A plantar locking plate is then fixated with locking screws

RESULTS

The illustrated procedure, first introduced in Germany in 2010, was used to complete 82 consecutive TMT1 arthrodesis procedures (Rockford, IL) in patients with varying indications from August 2014 to April 2018. Medical records of 49 subjects that underwent 53 TMT1 arthrodeses in HAV interventions were included in a retrospective chart review. Median visual analog scale scores decreased from 6.8 to 2.7. First intermetatarsal angles (IMA1) were reduced from 17.39° to 7.16° , standing lateral first metatarsal angles (SLFMA) improved from 21.66° to 23.94° and tibial sesamoid positions (TPS) were plantarized from 6.02° to 2.79° . Tension side plating allowed immediate weightbearing with transition to normal shoe gear at 6 weeks. Complications included 1 (1.89 %) non-union, 1 (1.89%) delayed union, 1 (1.89%) hallux varus, 1 (1.89 %) incomplete recurrence, 1 (1.89 %) minor dehiscence, and 1 (1.89 %) hardware irritation. No tibialis anterior ruptures or dorsal migrations were recorded.



Figure 2:
Post-operative Radiographs
Corrected first intermetatarsal angle (left) and standing lateral first metatarsal angle (right). Showing de-rotated and plantarized sesamoids in a non-pathologic, load bearing position.

OUTLOOK

TMT1 reconstruction with MetaFix™ Plantar BG10 facilitated early load-bearing with a durable locking construct (Fig. 3). Reduced pseudarthrosis rates are the consequence of tension-side plating that supports callus formation. Elevated rates of non-, delayed- or mal- union, generally correlated to dorsomedial locking plates, are not reproduced. Additionally, excessive proprioceptive feedback is prevented through the plantar implant location under the abductor hallucis muscle. This substantially lessens hardware irritation in contrast to previous reports with increased (12% - 15%) symptomatic hardware removal rates. The applied surgery technique does not require extensive or costly equipment while the deformity is intraoperatively reduced prior to joint resection. Merete® directly controls the correction manually under fluoroscopy and not indirectly through the orientation of the osteotomy planes. No tendon insufficiencies or ruptures occurred as a result of the intervention or during follow-up.

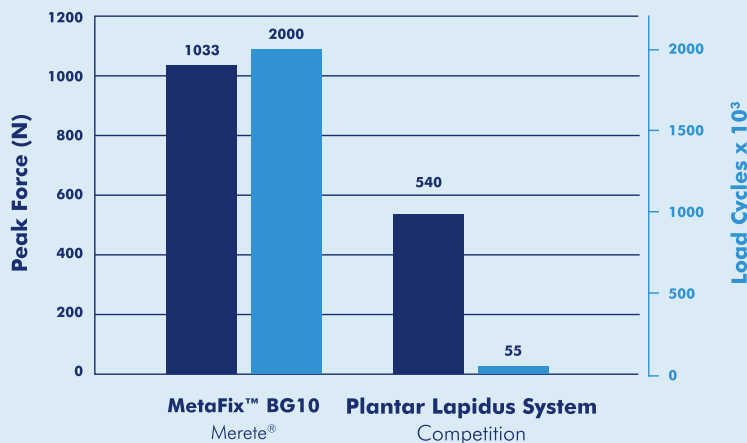


Figure 3:
Implant Durability in Four Point Bending Test

MetaFix™ Plantar BG10 endured 2×10^6 load cycles with peak forces > 1000 N (~2-fold improvement).



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All information relevant for the user or third parties regarding the safety and performance of the products presented can be found in the respective surgical technique and in the corresponding instructions for use. These must be carefully studied before use.