BIORESORBABLE FLAT FOOT IMPLANT

Surgical Technique
Pediatric Treatment

NOVAGENIT
PER COSTREUIRE IL FUTURO
When the functional issue can be assessed with clinical examination, or in uncertain cases, when it is confirmed by gait analysis.

Flat foot with tarsal fusion. In this case after the fusion removal the implant allows correction of the deformity associated.

Congenital vertical talus. In this case after soft tissue release, the device fills the gap between talus and calcaneal avoiding recurrence deformity.

Adult flat foot. In this case the added procedures (Achilles tendon lengthening and posterior tibial tendon retention) are necessary.

Posterior tibial tendon dysfunction type 1° and 2°, associated with suture repair of tendon transfer and Achilles tendon lengthening when necessary.

CONTRAINDICATIONS
- Neurological flat foot
- Flat foot due to severe ligaments laxity
- Adult flat foot with arthritis of the hindfoot joints

ANAESTHESIA
Anaesthesia can be general, peridural or peripheral, depending upon the individual case. General anaesthesia is usually preferred for children. Tourniquet: The use of a tourniquet is optional.
CONTRAINDICATIONS

- Neurological flat foot
- Flat foot due to severe ligaments laxity
- Adult flat foot with arthritis of the hindfoot joints

OPERATIVE TECHNIQUE

The patient is placed in the supine position with the foot internally rotated. A 1cm incision over the sinus tarsi is performed.

The extensor retinaculum is opened to the cuboid bone using curved scissors. By turning the tip of the scissors upwards and pushing in a medial direction towards the internal malleolus, the tip of the scissors can be felt going into the deepest region of the sinus tarsi.

A 6mm rod is introduced in the same direction followed by 8 and 10mm rods until the correction is obtained. The skin and the fibres of the retinaculum are opened with 2 small retractors to allow for the placement of the outer cylinder of the implant with a universal introducer.

The inner screw is inserted to open and stabilize the implant. The screw is tightened until the characteristic “squeaking” is heard from the material. The retinaculum is sutured with N. 3-0 reabsorbable thread and the skin is sutured with another stitch.

Usually this is the only procedure necessary if the patient is still on the growth age.
ADDED SURGICAL PROCEDURES

After correcting the deformity by inserting the implant, the dorsiflexion of the foot is checked with the knee in extension. If the Achille feits toserch 90°, the Achilles tendon is lengthened subcutaneously by two or three alternate hemisections, starting distally-laterally, then 3 cm above the previous one. The foot is forced in dorsal flexion to stretch the tendon until 10° dorsiflexion is achieved.

In case of navicular accessory or prominent painful navicular bone, or the interruption of the Meary’s line at the naviculocuneiform with an angle greater than 10°, a medial procedure is performed with retention of the posterior tibialis.
With a 3cm incision over the navicular prominence, the navicular bone is revealed along with the posterior tibialis. The peristeam is detached from the navicular bone and the posterior tibial tendon, maintaining the metatarsal expansion and fibres directed towards the navicular bone.
After tangential resection of the navicular prominence, remove any navicular accessory. The posterior tibialis is put under tension using a No. 2 reabsorbable stitch which passes through the dorsal periosteal flap.
Take the tendon of the posterior tibialis with a stitch, according Bunnell, and pass from plantar to dorsal through the spongy part of the navicular bone.
Added Surgical Procedures
By pulling the two ends of the thread, the tendon is advanced distally and fixed under the navicular bone. The suture is reinforced with another cross stitch.
The sheath of the posterior tibialis is sutured with No. 3-0 thread.

POSTOPERATIVE TREATMENT

When only the implant is inserted, it is preferable to use a walking boot for 2 weeks in order to reduce potential pain during walking and allow earlier return to normal activity. If other surgical procedures are associated, the recommended period of immobility with a boot is 5 weeks without weight bearing and 2 weeks with weight bearing. In both cases, when the boot is removed, normal footwear is worn and cycling and swimming are recommended.
MRI after 6 months shows the maintenance of the shape of the device, the device is breaking after 1.5 years, is partially reabsorbed after 3 years, and completely reabsorbed after 5 years.
REFERENCES

### IMPLANTS AND INSTRUMENTS

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The flat foot implant is a Class III medical device

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