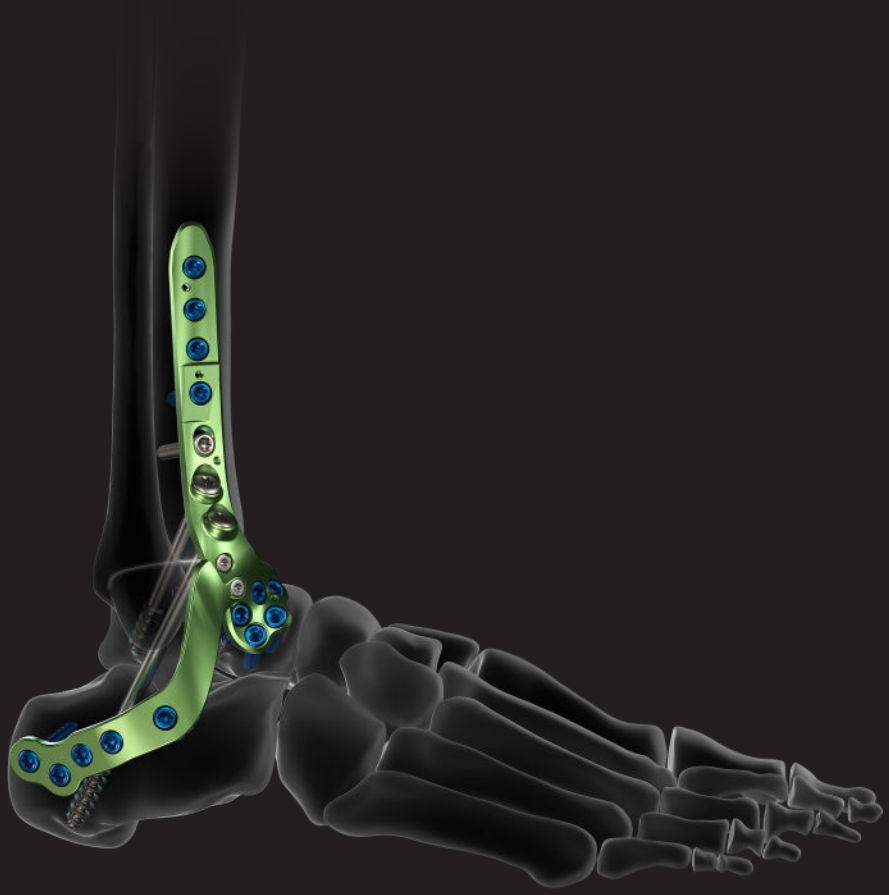
CASE STUDY.

NEWCLIP-TECHNICS



Dr Mathieu
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ACTIV FUSE:
Anterolateral construct for TTC fusion

Physician profile.

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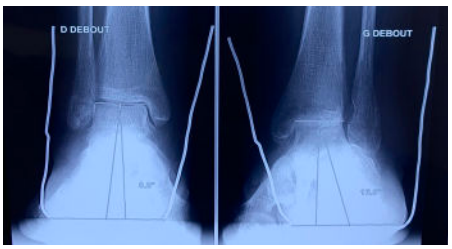
Patient history.

Case 1

The patient is a woman in her seventies suffering from a rhumatoïd arthritis treated by immunosuppressive drugs and corticosteroid therapy. The patient suffered from a severe tibiotalar arthrosis with a painful decompensation with a valgus flat foot, and from comorbidities included obesity (BMI >35). The preoperatory analysis highlighted an hyperfixing associated subtalar arthritis on scintigraphy. Due to this COFAS 4 arthrosis and the BMI of the patient, it had been decided to perform a TTC fusion.



Case 2

The patient is a man in his early eighties suffering from a Charcot foot stage IV (following the Sanders & Frykberg Classification) with a talus involvement and fixed varus deformity of the rearfoot. He has comorbidities including diabete and obesity (BMI >35). Due to this severe tibiotalar joint damage with loss of talar bone, it had been decided to perform a TTC fusion.

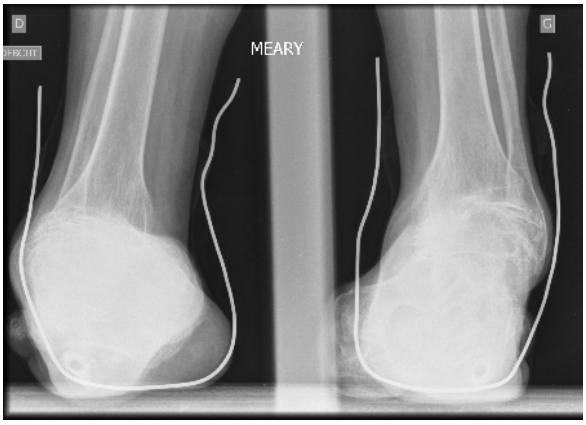
Case 3

The patient is a man in his seventies with an early cognitive disorders who underwent complex ankle and rearfoot trauma a couple years ago (non-surgical treatment). The patient has a severe locked varus hindfoot not allowing walking and a malunion of the talus neck, a subtalar dislocation, a complete Chopart dislocation and tibiotalar pain. Due to this polyarticular disease, it had been decided to perform a TTC fusion associated to a Chopart arthrodesis (talonavicular and calcaneocuboid joints).

Case 4

The patient is a disabled woman in her late fifties suffering from a rhumatoïd arthritis treated by immunosuppressive drugs, with deformities and polyarticular damages (bilateral hip & knee arthroplasties). She is suffering from a non-flexible cavus foot and a disabling ankle arthrosis.

Due to this polyarticular disease of the midfoot and rearfoot without articular mobility, it had been decided to perform a TT fusion and a tarsectomy with patient specific cutting guides (PSI).



Surgical treatment.

Treatment choice and surgical planning

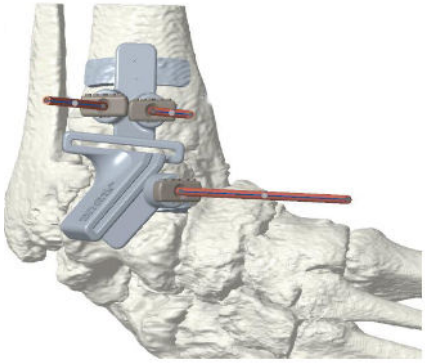
The decision to perform a TTC arthrodesis in the first two cases of tibiotalar diseases was primarily motivated by age, obesity, and moderate functional expectations. Furthermore, case 1 required concomitant treatment of subtalar arthritis and hindfoot valgus deformity. TTC arthrodesis seemed to be the best choice to address this COFAS 4 arthritis.

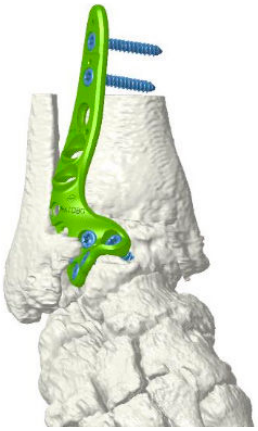
In case 2, the patient had an ankle deformity with bone loss in the talar dome, and a varus hindfoot. Isolating tibiotalar arthrodesis for this obese and diabetic patient seemed insufficient.

In the last two cases a preoperative planification analysis was performed after 3D reconstruction of scanner images with the company Newclip Technics.

In case 3, the deformities being consecutive to untreated hindfoot and Chopart dislocations, and given the significant post-traumatic delay and the patient's age, the decision to perform a complete hindfoot arthrodesis while correcting the deformity seemed the most appropriate.

Finally, case 4 presented a major tibiotalar deformity without subtalar pain. 3D planning for TT arthrodesis with an anterolateral subtraction patient specific cutting guide (PSI) allowed a realignment of the hindfoot. Since the midfoot was also locked and arthritic, a complementary tarsectomy using a second patient specific cutting guide (PSI) was decided to restore proper weight-bearing. The forefoot deformity was not addressed during the same surgical procedure and will be treated subsequently if necessary.





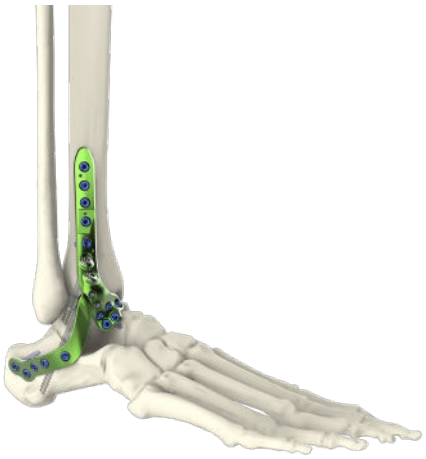
Material choice

The decision to use a locked anatomical anterolateral plate was taken for the two main following reasons:

• The possibility to perform a single anterolateral skin incision to prepare ankle and midfoot joints. This seemed essential for these patients at high risk of complications, with two of them being immunosuppressed and one being diabetic. Additionally, in the three cases with fixed varus hindfoot, this anterolateral approach has the advantage of avoiding excessive skin tension after deformity correction.

• The rigidity of the material used: this helps to decrease the risk of non-union and secondary displacement while enabling early weight-bearing on the operated limb. It appears particularly important for these patients who have difficulties or even impossibility of non-weight-bearing ambulation due to their comorbidities. The calcaneal extension of the plate, in particular, provides greater fixation rigidity at the subtalar joint compared to other commonly used fixation methods.

The four patients were all operated at the Hôpital Nord in Marseille in a specialized department adapted to complex cases.



Surgery.

The patient is positioned in lateral decubitus under general anesthesia with a thigh tourniquet inflated to 250mmHg. A peripheral nerve catheter had been previously placed to optimize postoperative analgesia.
An anterolateral approach to the ankle was performed, varying in distal extent depending on the involvement of the midfoot (cases 3 and 4).
In three cases, a distal fibular osteotomy at the syndesmosis level was necessary to reduce the deformity. Surface preparation was then carried out and maintained with temporary K-wires, except for the case 4 where bone resection was performed using a cutting guide.

The proper positioning of the tibiotalar joint was firstly achieved, and then the subtalar joint. In the three TTC fusion cases, a lateral approach to the calcaneal tuberosity was done to expose the tuberosity and allow the insertion of the plate extension under the fibularis tendons after preparation with a rasp.

Treatment of the midfoot in cases 3 and 4 was then performed once the hindfoot and ankle were stabilized using the same lateral approach extended distally.

An aspirating drain was placed in all four cases, and skin closure was an intradermal suture in case 1 and staples in the other three cases.

Post-operative protocol.

The four patients were immobilized with a Aircast boot for 6 weeks.

All patients were seen for scar assessment and to initiate progressive weight-bearing in the boot at the 3-week postoperative visit (Day 21). The boot was then removed at Day 45 postoperative, and physical therapy was initiated at the same time.

It should be noticed that, for case 3 who had early cognitive troubles, the patient did not respect the wear of the boot and the non-weight-bearing instructions, and walked at night, starting from day 0 postoperative. However, no secondary displacement or skin issues were observed.

Results.

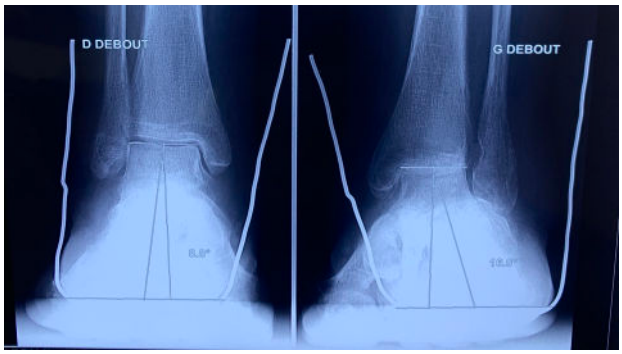
The four patients showed a bone consolidation of their arthrodesis sites and satisfactory skin healing without postoperative infection despite their comorbidities.

To date, no patient has required revision surgery (maximum follow-up of 2 years).

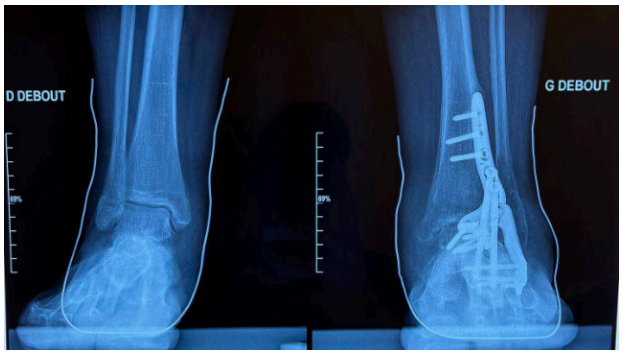
The four patients are satisfied with their surgery and are able to walk more satisfactorily than before, in particular cases 3 and 4 who were almost not able to walk anymore.

Only the patient in case 1 has subcutaneous discomfort from the material at the level of the calcaneal extension but does not wish to remove it.

Case 1 :



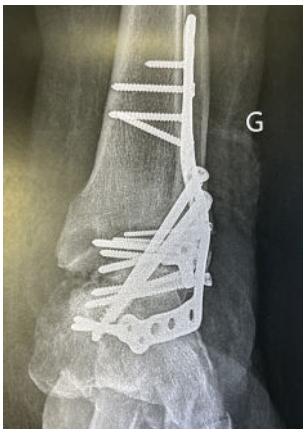
Pre-op



Post-op

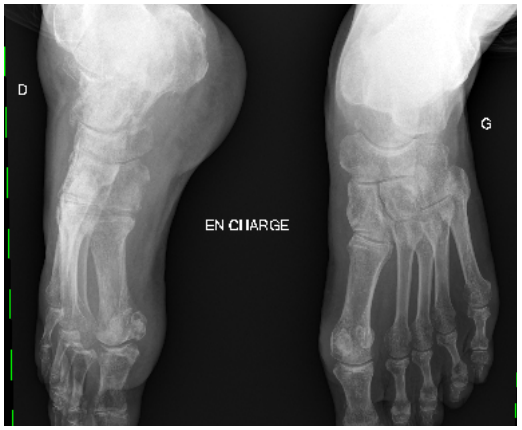
Case 2 :

Pre-op

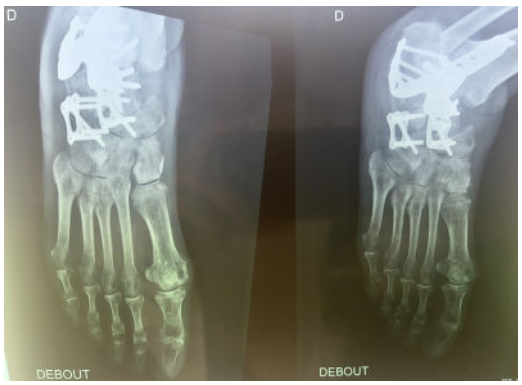


6 weeks post-op x-rays

Case 3 :



Pre-op

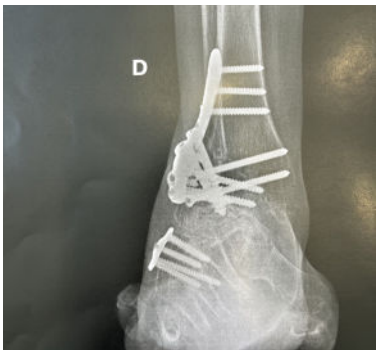


Immediate post-op x-rays

2 months post-op x-rays

Case 4 :

Pre-op



6 months post-op x-rays

Conclusion.

The use of a locked anatomical anterolateral plate from the Activ Fuse range is, in my opinion, a reliable and reproducible technique allowing to manage complex patients without increasing the morbidity of the procedure. The lateral approach allows to limit cutaneous complications. The anatomical design and the rigidity of the plate facilitate the reduction of deformations and guarantee bone fixation even in these cases where bone quality is poor (rheumatoid arthritis, diabetic charcot foot, advanced age patient) or in a context of obesity.

The preoperative planning on scanner and the use of PSI in particular cases is a real added value in the optimization of the operative time and the anticipation of potential intraoperative technical difficulties.

The Activ Fuse range allows early weight-bearing for simple or complex cases, thus improving patient care and postoperative experience.