Bimalleolar ankle fracture fixation of a 13-year-old patient with two ActivaScrew™ LAG bioabsorbable screws.

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Summary Table

Demographics

Patient number:	P01	Patient Initials:	NX
Smoking:	No	Sex:	Female
Use of alcohol:	No	Age:	13 Years
Systemic disease:	No	Height:	158 cm
Cont. Medication:	No	Weight:	40 kg

Case description

Diagnosis: Dislocation right ankle - bimalleolar fracture

Cause of injury: Gymnastic injury

Operation

Operator: Lascombes Operation year: 2016

Operation description: Open reduction of medial malleolus and fixation with TWO resorbable screws

Operation time: h 57 min Immobilisation method: below the knee cast

Hospital stay: 2 Days No weight bearing: 6 Weeks

Sick leave: Days Partial weight bearing: - Weeks

Bloodless field during operation: No

Prophylactic antibiotics: Yes If Yes, Name of Antibiotic: Zinacef

Implant 1: ActivaScrew LAG Size: 3.5 x 45

Comments on implantation:

Implant 2: ActivaScrew LAG Size: 3.5 x 35

Comments on implantation:

Note:
Immediate reduction of the dislocation at emergenry room - ketamine. Surgical treatment 5 hours after the injury.

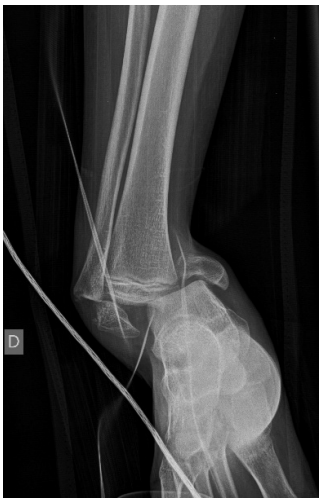
Follow up

	Post Operative	Follow up 1	Follow up 2	Follow up 3	Follow up 4
Time after operation (Weeks):	-	1	20	34	131
Obj. result:	Excellent	Excellent	Excellent	Excellent	Excellent
Subj. result:	Good	Good	Excellent	Excellent	Excellent
Radiological position:	Excellent	Excellent	Excellent	Excellent	Excellent
Radiolog. parameter (mm, deg):	anatomic reduction	= controlateral	= controlateral	= controlateral	= controlateral
Bone union:	-		Complete union	Complete union	Complete union
Swelling:	Moderate swelling	Moderate swelling	No swelling	No swelling	No swelling
Redness:	No redness	Moderate redness	No redness	No redness	No redness
Tissue reaction:	No tissue reaction	Mild tissue reaction	No tissue reaction	No tissue reaction	No tissue reaction
Pain:	Severe (continuous med.)	Moderate (occasional med.)	No pain	No pain	No pain
Range of motion:	Not applicable	Not applicable	Normal	Normal	Normal
Physical activities:	Very limited activity	Very limited activity	Modified activity	Modified activity	Modified activity
Infection:	No infection	No infection	No infection	No infection	No infection
Reoperation:	No	No	No	No	No

Note:
Modified activity is mainly due to a recurrent shoulder dislocation, and fear to practice gymnastics. Other sport activities returned to previous level.

1 Case Description

A girl 13 years old presents with a fracture dislocation of the right ankle joint following a gymnastic fall. Figure 1a and 1b show the medial dislocation, and the fractures of both medial and lateral malleolus. Lateral malleolus fracture is mainly a Salter-Harris type I, as medial malleolus fracture is mainly a Salter-Harris type IV. Both fractures present with some communitive small fragments.

1a. 

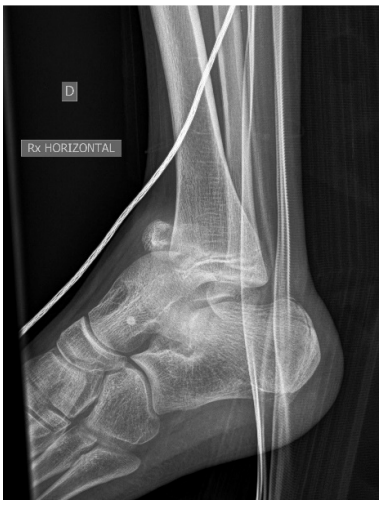
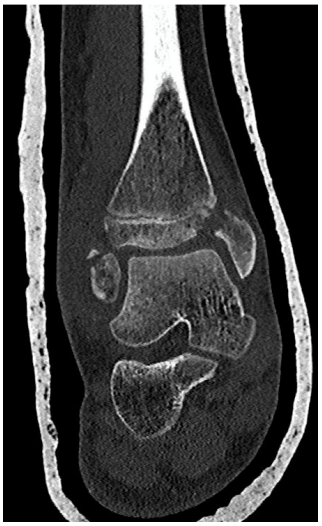
1b. 

Figure 1a and 1b Preoperative X-rays.

At the emergency room, the dislocation of the ankle joint is immediately reduced under a ketamine® sedation. Her fractures were immobilized with a temporary splint, and a CTscan was performed (figure 2). Figure 2a shows some small bony fragments as figure 2b demonstrates a persistent talo crural subluxation.

2a. 

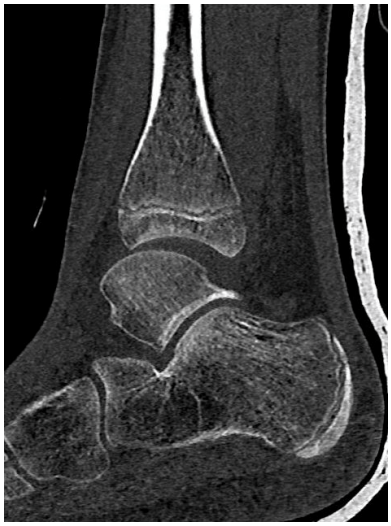
2b. 

Figure 2a and 2b Preoperative X-rays.

2 Implants and operative technique

Five hours after the injury, the patient was admitted to the operating room. The reduction of the subluxation and the fractures were performed by manipulation. Because the quality of the reduction of both fractures was considered as good, fixation of the medial malleolus was decided using two resorbable screws.

At that time, ActivaScrew™ Cannulated LAG screws were not available in our institution. We have used partially threaded screws, 3.5mm diameter and 45mm length. After a percutaneous skin incision, one hole was performed strictly into the epiphysis with a drill, 2.5 mm, under the control of a C-arm in order to be parallel to both physis and joint (figure 3a).

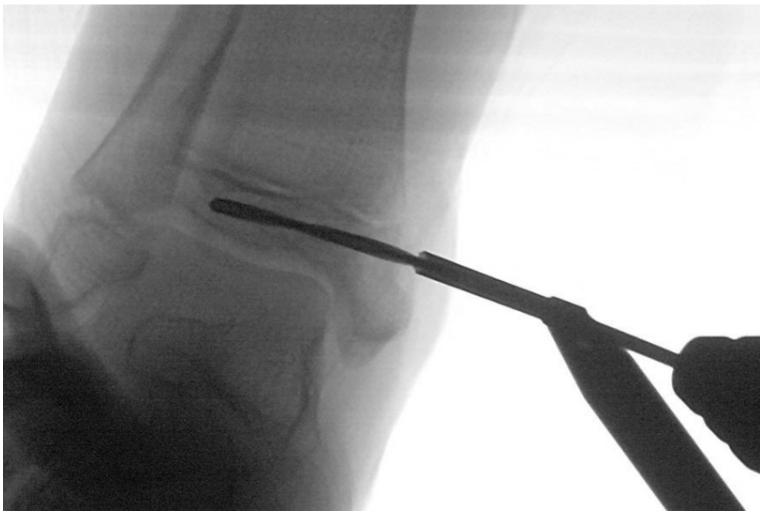


Figure 3a Position control with c-arm.

Then, the cortex was enlarged with a countersink in order to bury around 50% of the screw head. The adapted tap, 3.5mm in this case, is mandatory to be used. Finally, the screw was inserted with its adapter cap. At that moment, the first screw was not yet tightened. A second screw, same size, the same technique was inserted posteriorly and almost parallel to the first one. After a new C-arm control, we tightened both screws: we just turn the screwdriver until the metallic adapter head pulls out. Please don't continue to tighten the screws themselves as the head of the screws may break, leading to a complete loosening of the compressive effect on the fracture.

Another imaging control showed that the fracture line completely disappeared, proof of an excellent reduction. An immediate arthrogram of the ankle joint confirmed the excellent reduction of both fractures (figure 3b). An immediate immobilization was done with a splint, replaced three days later with a resin below the knee cast.

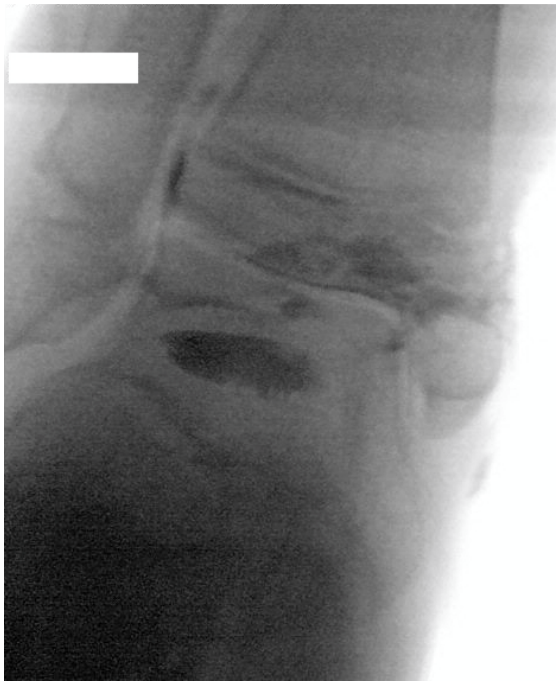
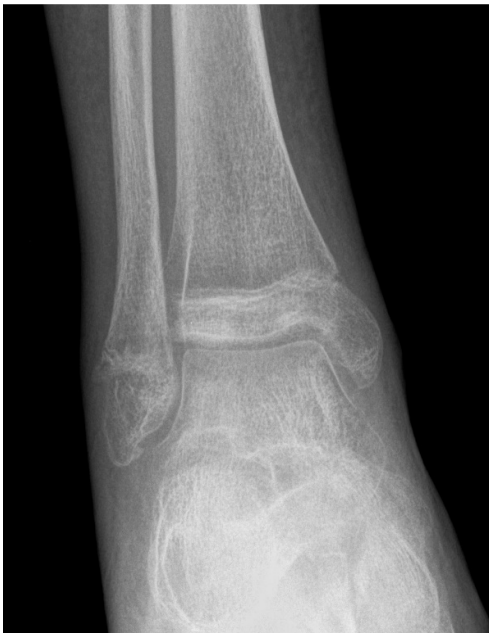


Figure 3b *Reduction control x-ray*

The surgical procedure has been performed under general anaesthesia due to the young age of the patient, without any tourniquet, by a mini-invasive procedure with two percutaneous skin incisions. Duration of the whole procedure was 57 minutes.

3 Outcome

Immobilization duration and absence of weight bearing duration was 6 weeks. On X-rays at 6 weeks, the bone-union is visible (figure 4a). On the lateral view, one hole shows the position of the posterior screw (figure 4b). Locally, the scar was of good quality, there were neither swelling, nor redness, nor tissue reaction, nor pain. Some physiotherapy was required, and full weight bearing rapidly recovered. Three months later, the range of motion of the right ankle was comparable with the left one. The girl was able to practice most of her sport activities like before.

4a. 

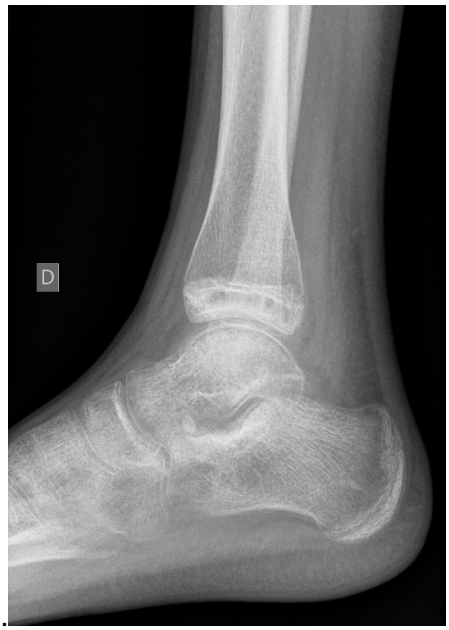
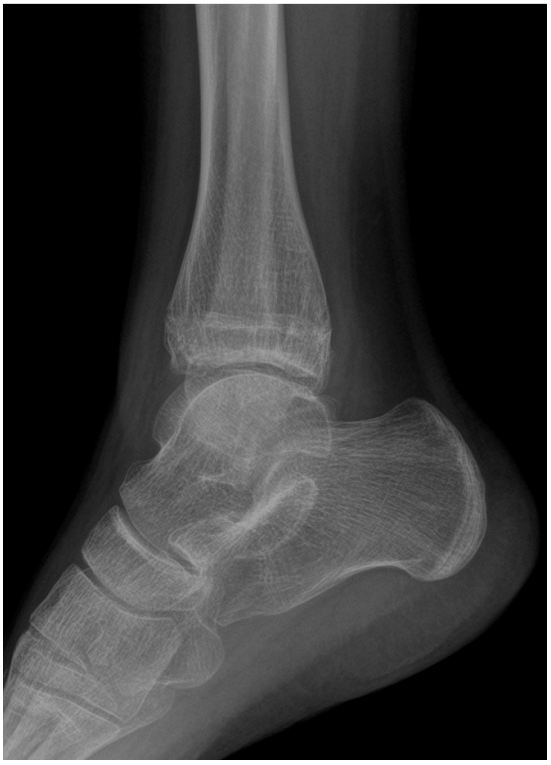
4b. 

Figure 4a and 4b X-ray at 6 weeks postoperatively

After one year later, the function of the right ankle was normal (figure 5a), and both lower limbs were equal in length (figure 5b). Her activities were normal. Unfortunately, she presented a recurrent shoulder dislocation, independently of the ankle fracture, and she just decided to stop high-level gymnastic because a fear to get a new fall.

5a. 

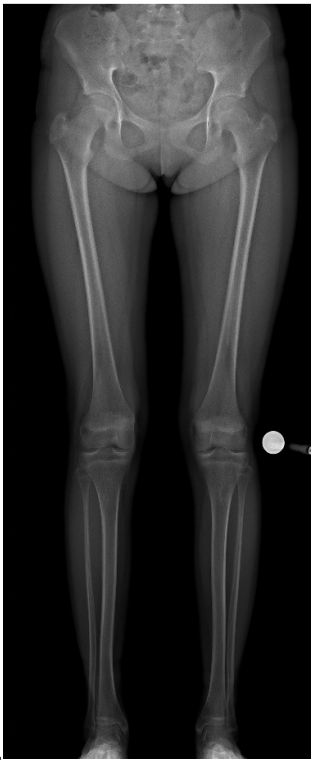
5b. 

Figure 5a and 5b X-ray at one year postoperatively

4 Contact Information Concerning the Case

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