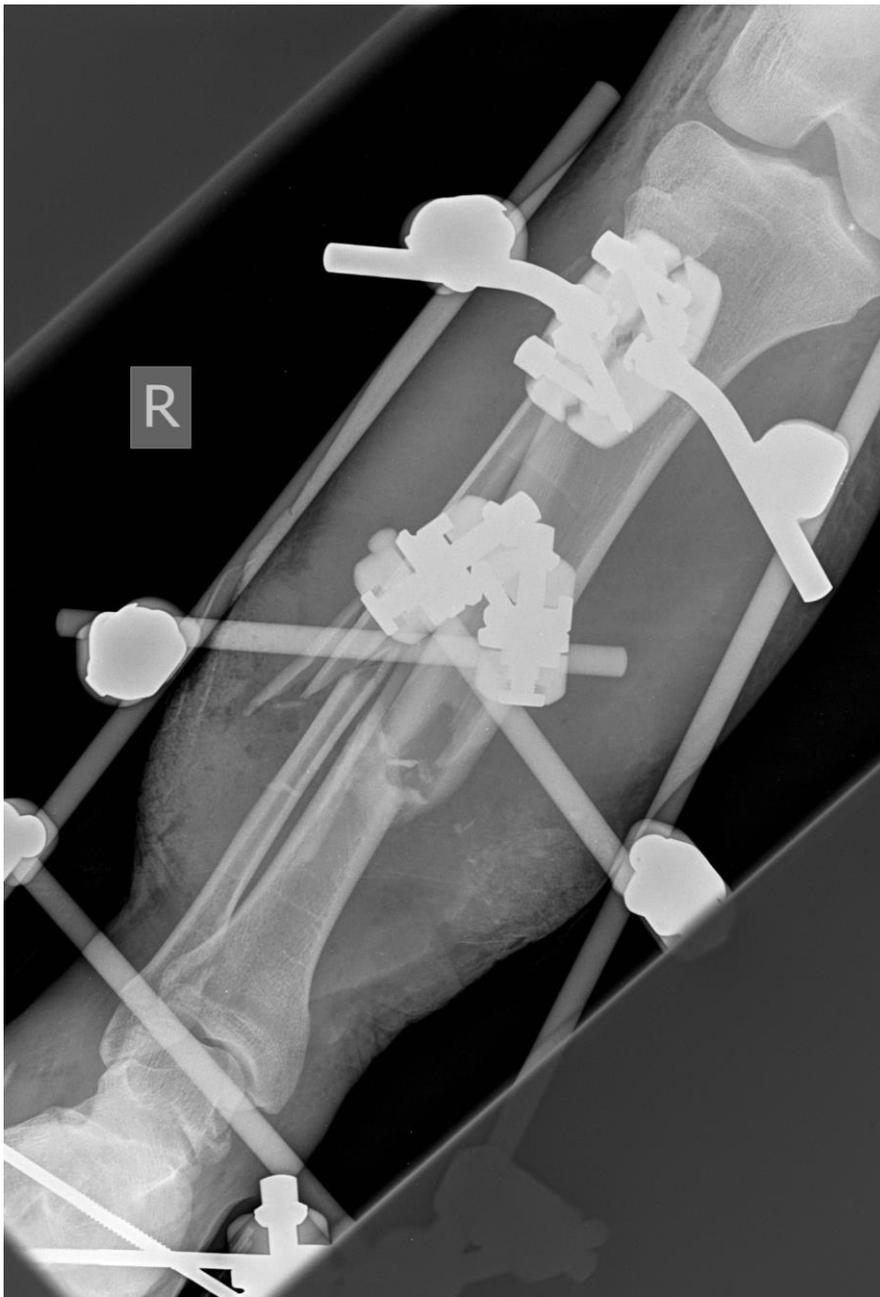


Options for open fracture fixation data fields (temporising and definitive procedures)



Background

Severe open fractures of the lower leg have been part of the observed standards of care recorded on the TARN database for some years now. The data collection was based on the British Orthopaedic Association Standards for Trauma, fourth issue (BOAST 4) featuring elements from the BAPRAS guidelines for the care of open fractures (<http://www.bapras.org.uk/docs/default-source/commissioning-and-policy/standards-for-lower-limb.pdf?sfvrsn=0>).

As with all elements of healthcare, systems mature and change over time. The policy surrounding open fracture care has also changed to align with new policies. Since this instigation of the BOAST 4, there has been a NICE guideline for Major Trauma and within this, new guidelines for the management of open fractures. All very similar but subtly different, which often leads to confusion! The NICE guideline was published in February 2016 and last updated in November 2017 (<https://www.nice.org.uk/guidance/ng37/chapter/Recommendations#pre-hospital-settings>) and whilst on the surface very similar to previous guidelines above, it now extends to include fractures in most of the foot and the long bones of the upper limb. Equally it has changed some recommendations around timing of surgery in some fractures.

Following on from these publications, the BOAST 4 was updated by ourselves at the BOA Trauma Group in December 2017 and is now simply called 'Open Fracture BOAST' and it pertains to all long bones, including the upper limb as well as the non long bones of the hindfoot and midfoot (<https://www.boa.ac.uk/uploads/assets/uploaded/6418c4a3-d355-4f15-a258cfef62b4729f.pdf>).

Procedures and fixation options

One of the key features of recording meaningful data regarding open fracture care pertains to identification of several datafields:

1. Evidence of documented review by a Consultant Plastic Surgeon and Consultant Orthopaedic Surgeon, together BEFORE any procedure.
2. Presence of a Consultant Plastic Surgeon and Consultant Orthopaedic Surgeon together at first debridement. So on both these points its important to date time stamp the involvement of these individuals from the notes.
3. Identify the number of procedures done and split the first procedure off from any (subsequent) other procedures. This is because what is done at the first (often emergency) procedure is often very different to the second or third or fourth (definitive, planned, reconstructive) procedures. The 'rules' or what is meant to happen differ between the first procedure and anything that follows.
4. Implants / equipment used to hold the bones (fixation). Often these will change depending on the operation (initial, emergency OR subsequent, definitive). Its important that we are able to



identify the metalwork used at each operation. For the vast majority of cases, there will be the following patterns:

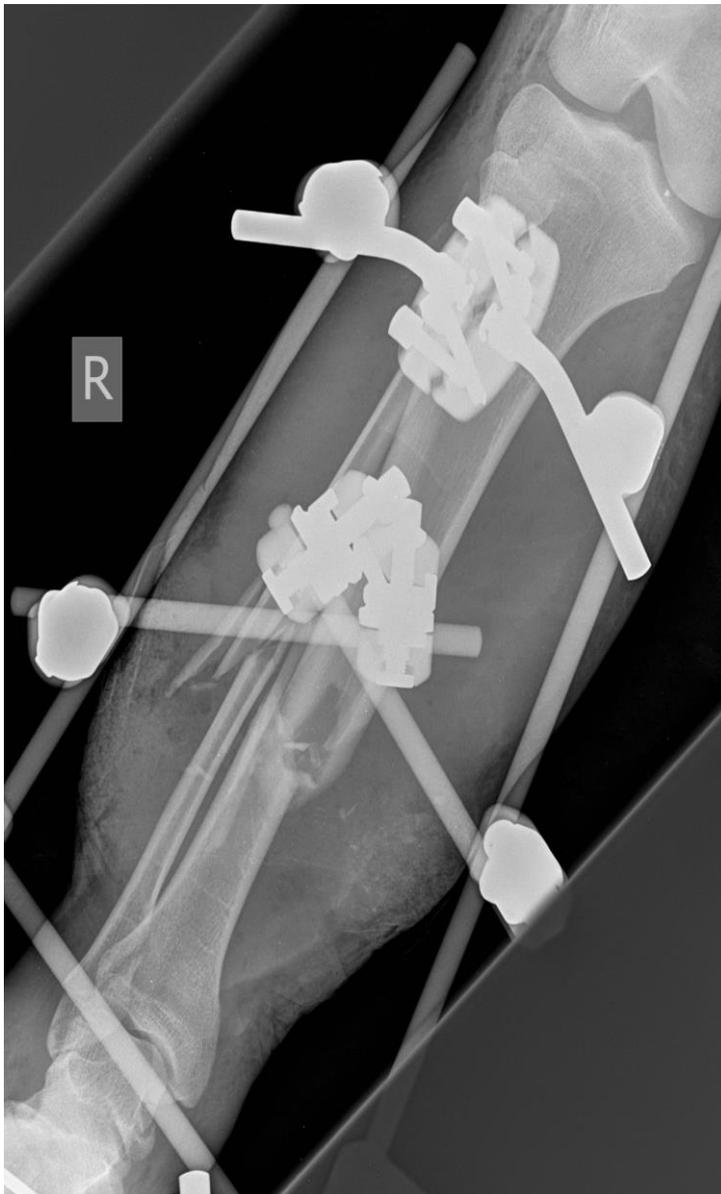
First procedure: Debridement and placement of an external fixator (temporary monolateral) and words such as 'Ex Fix', 'monolateral spanning fixator', Hoffmann frame or Jet-X fixator for example may feature. At this time there will be some attention towards the soft tissues which is covered elsewhere but will most likely involve a dressing of some nature or any one of the soft tissue operations.

Other options at first procedure could be that instead of a simple fixator being used, the surgeon may elect to apply a more complicated ring fixator. Again words like 'circular frame', ring fixator, Ilizarov frame, Taylor Spatial Frame, TSF or Orthofix TL Hex frame may crop up. This frame may either be temporary or definitive, most commonly the latter but this will be clear from any subsequent procedure.

Again, there may only be one procedure. This would mean that the definitive fixation and skin cover happen all in the first (and only) operation. This is more rare but increasingly common in elderly people. If this is the case, all options for fixation and skin cover are open. Rarely the temporary monolateral fixator may be used in this circumstance but that's really rare. A circular frame may be used but also internal fixation (plate or nail) can be done if its all done in one go at the first operation. An example of this would be a relatively simple fracture that can be nailed or framed and has a simple skin procedure carried out. Another example would be a nasty bone fracture of the tibia in an older person in which the bone is shortened a bit to allow a nail to be placed and the smaller hole created to be closed easily or skin grafted.

Second Procedure : this is most commonly a planned reconstructive procedure occurring a couple of days following the initial debridement and temporary stabilization. At this point, the initial fixation is removed (removal of Ex fix / monolateral fixator) and some other stabilization used (nail or plate or ring fixator) and at the same time the definitive skin procedure occurs.

In some cases patients will have repeated visits (really dirty fractures, unwell and too unfit for skin cover etc). Its common practice to keep the fixator that is put on at the first procedure in place for these so these can be seen as 'extra' or additional procedures occurring between the two most important procedures – the first, initial procedure and the definitive procedure. As stated this is normally seen as tibial operation one and two but that may not always be the case.



Radiograph (XR examples)



1. This is an example of a temporizing external fixator. Note the bars running down the length of the leg joined to pins in the bone by clamps. These fixators can very occasionally be used as definitive fixation (in children and very rare cases) but ordinarily are put on at the first operation then are removed at later operations for one of the three definitive treatments.



(a)



(b)

2. This is an example of an intramedullary tibial nail, another one of the fixation options. It can be used at the first operation as definitive care or can be used for definitive care later at subsequent procedures if another fixation method has been used first. Such a nail can either be placed



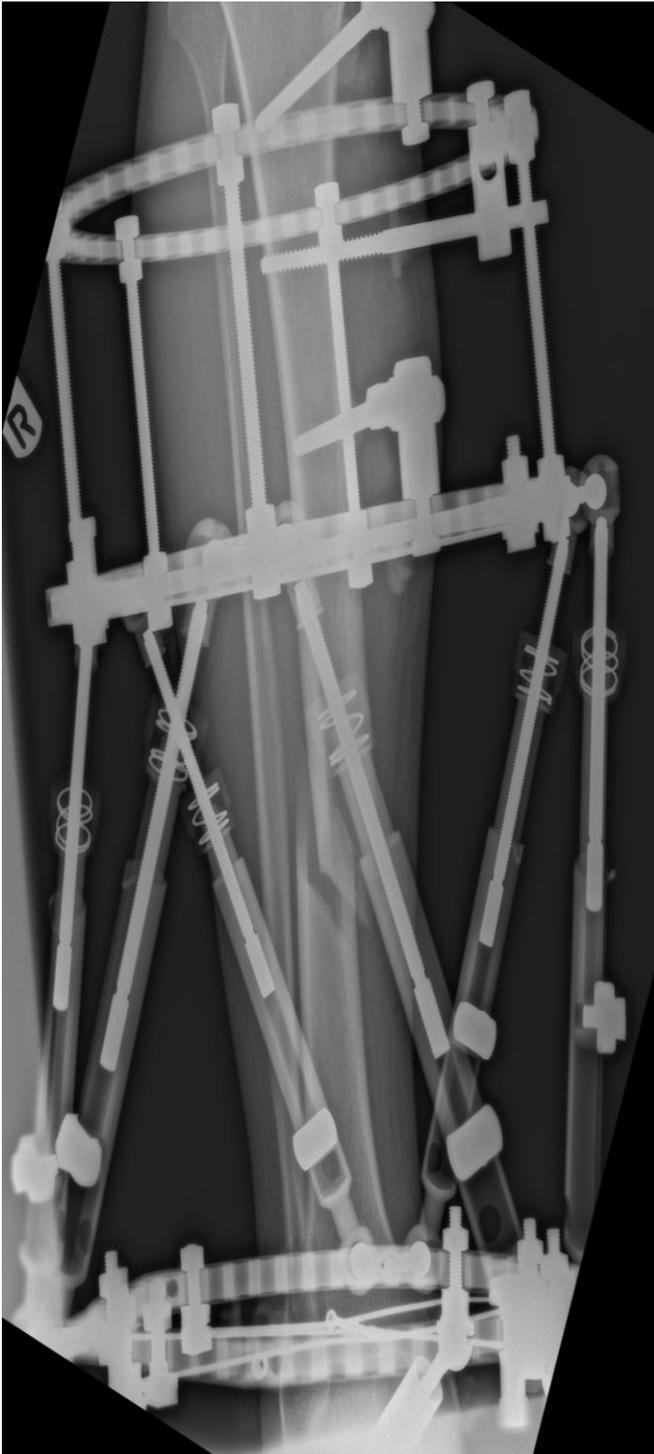
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'antegrade', through the proximal tibia at the knee (a) or retrograde, entering the tibia from below via the heel (hindfoot nail) (b).





3. This is an example of a circular frame (ring fixator). Again can be used as definitive management at the first operation but again, like the nail or plate is more commonly applied at the second or third operation. Comparing it with the temporizing external fixator, you can see that there aren't bars but instead rings around the outside of the bone.

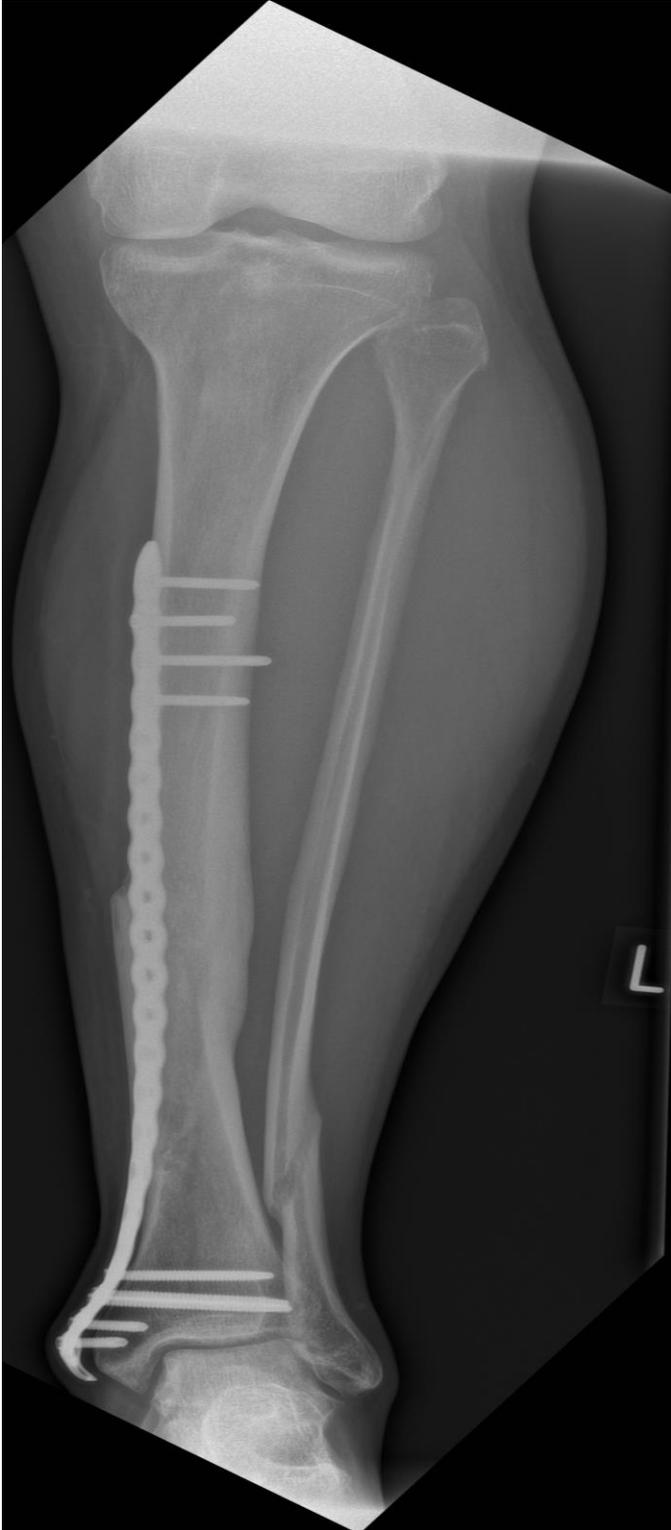


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4. This is an example of a plate fixation. This may be documented as 'bridging plate' or 'periarticular locking plate'. Again most commonly used as definitive fixation following initial stabilization with a spanning external fixator, it may also be used for certain fracture types at the first operation.

Summary

There are four common modes of fixation of lower limb fractures, particularly those involving the tibia. They all can feature at either operation but the commonest pattern is for a temporizing fixator to be placed (monolateral external fixator or 'ex fix') followed at definitive fixation with a nail, a plate or a circular frame.

Identifying who sees the patient beforehand, evidence of a combined orthopaedic and plastic surgery review is important. Identifying initial, emergency operations from following reconstructive or definitive procedures is also important and who performs them is again key.