NEWCLIP-TECHNICS

HTO OPERATING TECHNIQUE USING CUSTOM JIG

HTO using custom jig: operating technique

1 – Surgical Approach

- We keep identical rules for the approach used in traditionnal HTO.

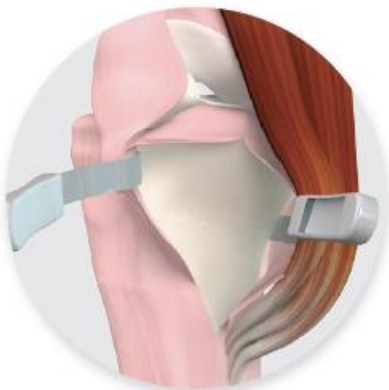
1. Placer le patient en décubitus dorsal, sous garrot pneumatique avec un petit coussin sous la fesse du côté opéré pour mettre le membre en rotation neutre.

2. Effectuer une incision verticale légèrement oblique de 8 cm de long à la face antéro-interne, débutant en regard de l'interligne articulaire et jusque sous la tubérosité tibiale.

3. Inciser en un plan jusqu'au tibia le plan tendineux et périosté ; puis décoapter l'ensemble comprenant la patte d'oie et le ligament latéral interne vers l'arrière.
Plus la correction angulaire doit être importante, plus la libération de la patte d'oie et du ligament latéral interne doit être étendue distalement.

ATTENTION : Si cette libération est suffisante, l'ouverture de l'ostéotomie et l'insertion de la greffe se feront sans casser la charnière externe. Si elle est insuffisante, l'insertion en force de la greffe ouvrira la charnière externe avec la conséquence potentielle grave d'un échec de consolidation de l'ostéotomie, ie : pseudarthrose.

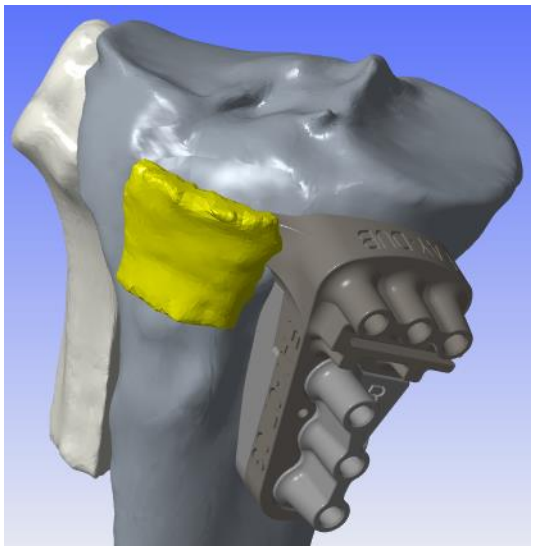
4. Décoller précautionneusement la face postérieure de la métaphyse tibiale, l'écarteur doit rester en place comme protection pendant l'ostéotomie.

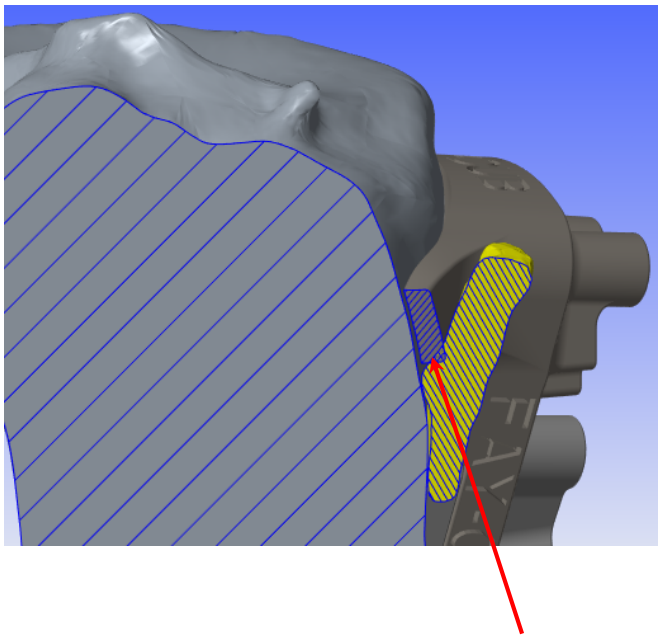


5. Dégager la face profonde du tendon rotulien jusqu'à son insertion sur la tubérosité tibiale et le protéger par un écarteur lors de l'ostéotomie.

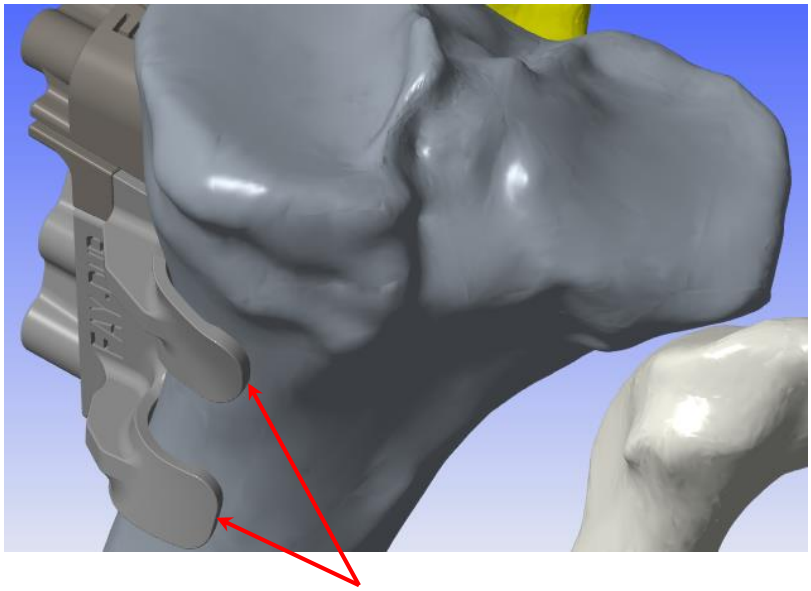
2 – Custom jig positioning

- Custom jig is positioned in order to be anatomic and comply with tibia bone internal anterior surface, it is also suitable to apply properly the anterior bracket pushing down stronlgy the entire custom jig on the rotular tendon insertion.





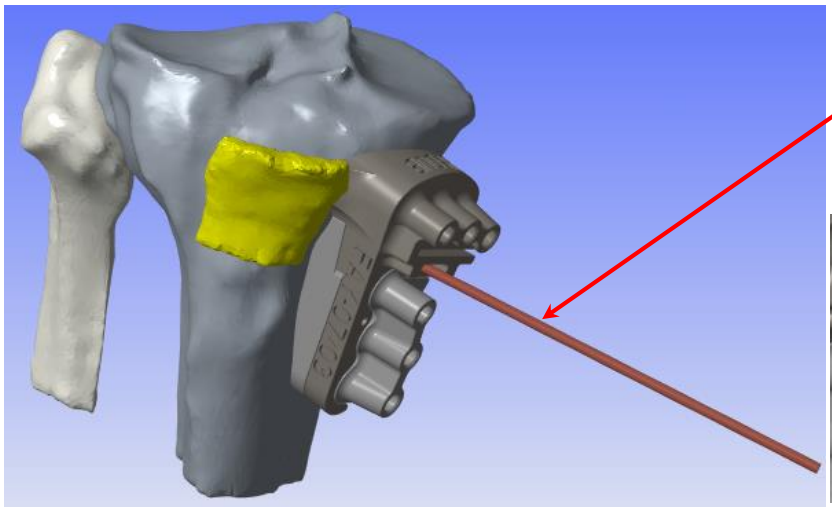
The anterior bracket is designed with a slight interference



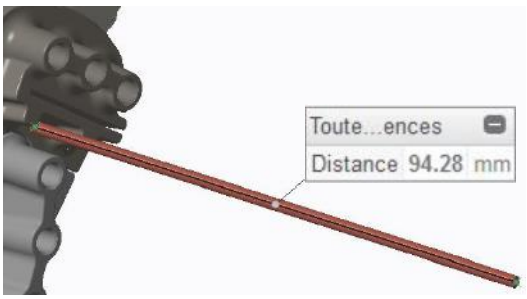
The two distal brackets applied in posterior side are 100% congruent to the tibia surface, they are elastic in order to avoid any gap.

3 – custom jig pre-holding, positioning confirmation and final cut point visualisation.

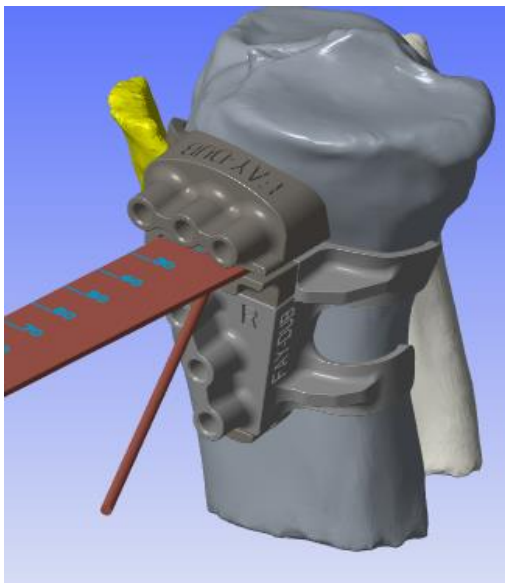
- When custom jig is well positioned, and still keeping it applied on the tibia, do insert a transfixiant 2.2mm K-Wire through the custom jig and the tibia, until reaching the value mentioned in the final planification file.

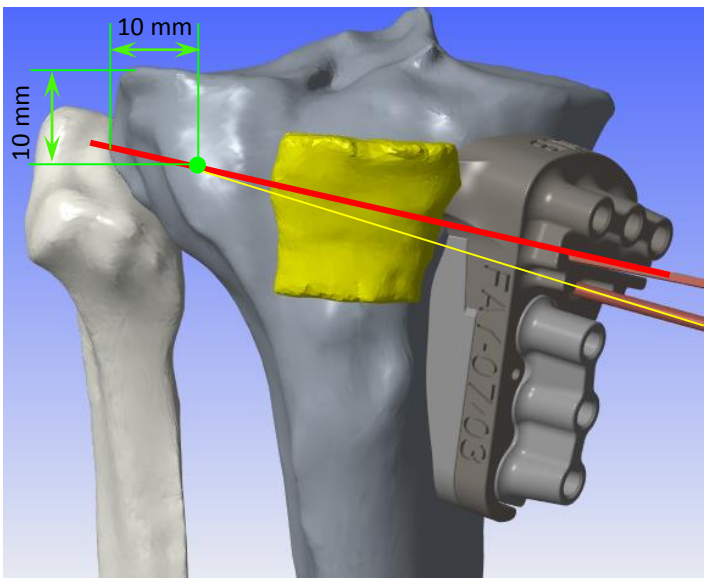


K-Wire 2.2mm diameter included in the instruments set (for instance an example on the value to reach) :



- now considering custom jig pre-holded, slide the saw blade through the dedicated guiding window in order to check the correct direction of the cut thanks to a X-Rays shot putting the leg into flat position.

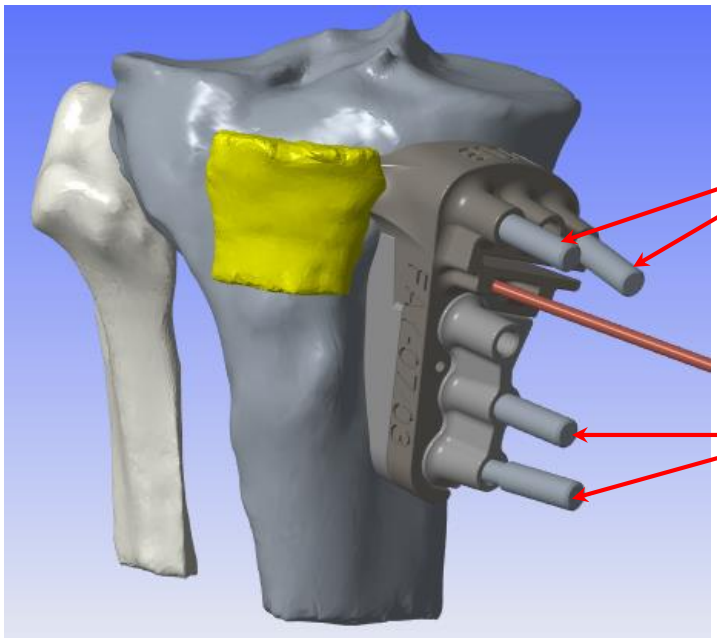




The cut is ascendant and target the fibula head , the K-wire direction and the saw blade run, meet into a end cut calculated point where hinge is located to 10mm in both axis.

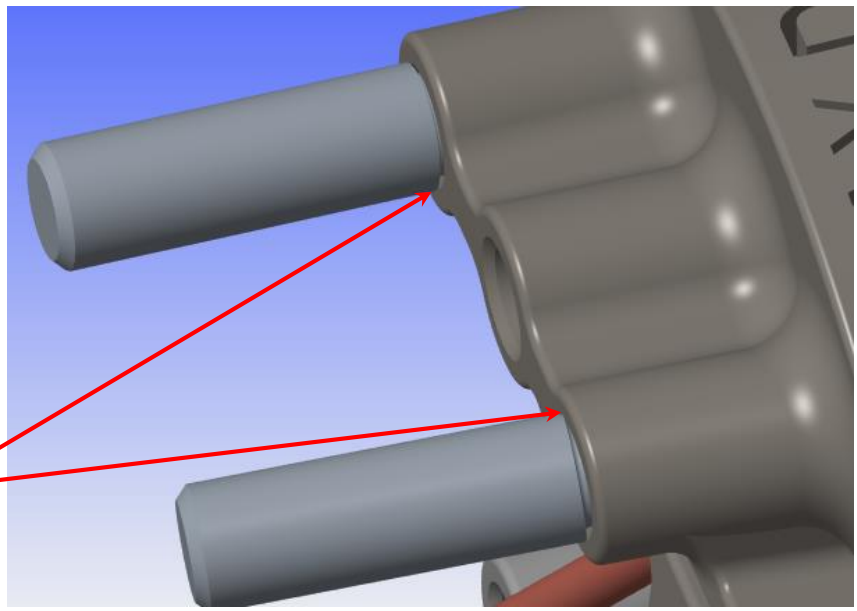
4 – custom jig total holding

- Cut angle now verified, there are **4 pins minimum** to be inserted in the tibia, 2 in proximal side and 2 in distal side thanks to the 4.0mm drill instrument : **Nevertheless the 6 drilled holes must be done**. The 3 proximal drilled holes are blind and the 3 distal drilled holes are bi-cortical.



2 pins in proximal must be located as far as possible from each other

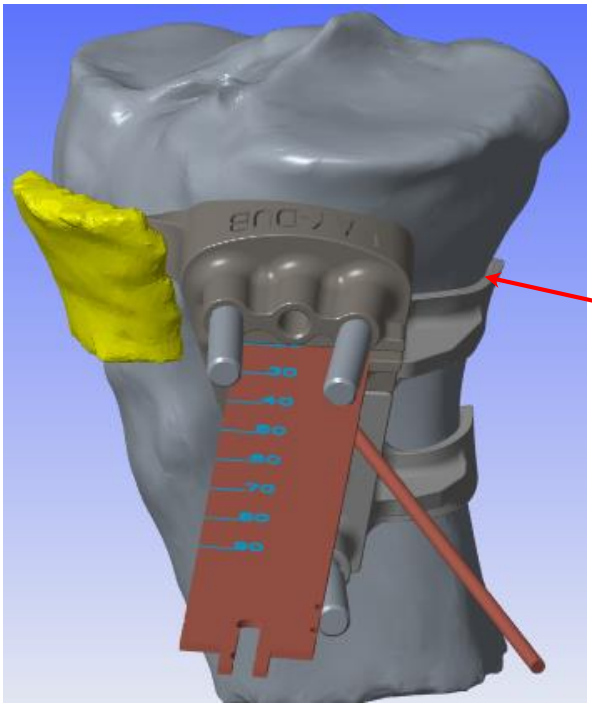
2 pins in distal placed most distaly possible.



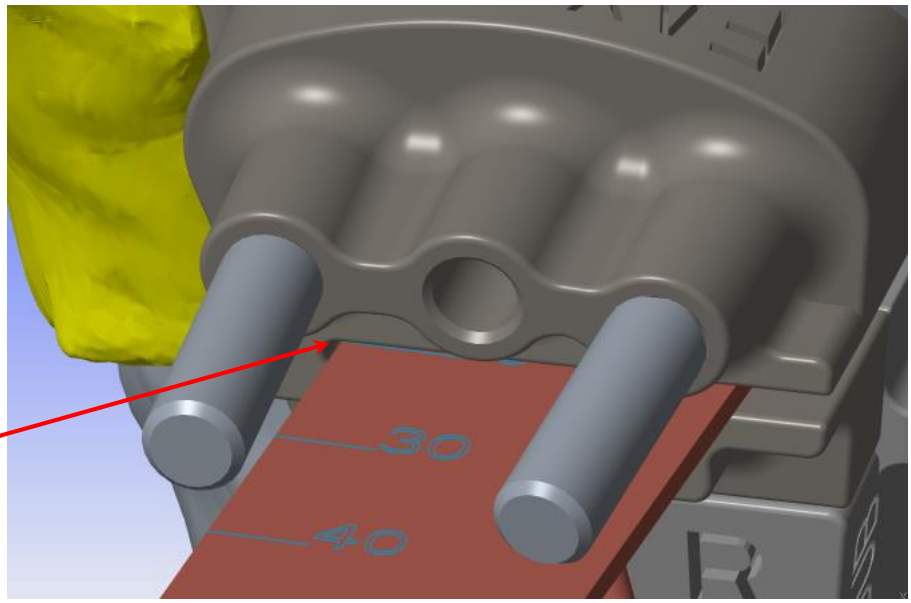
pins are inserted to end run position with a hammer.

5 – Cut phase 1

- The custom jig is now holded strongly, the cut can be started until coming to end run position in the custom jig upper part window :



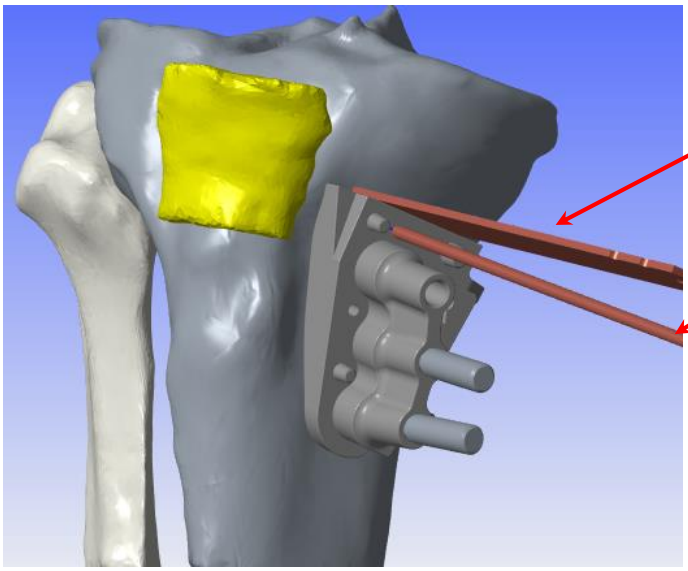
This bracket allows to have a supporting guide for internal cut, the saw blade can be applied on it.



Window end run in the custom jig upper part

6 – Cut phase 2

- After having removed the engine and the saw blade , custom jig upper part can be dissasembled after removing the K-wire and the 2 proximal pins thanks to the plier included in the instruments set.
- When this done, K-wire must be inserted again through custom jig lower part with a new value mentioned in the planification file :

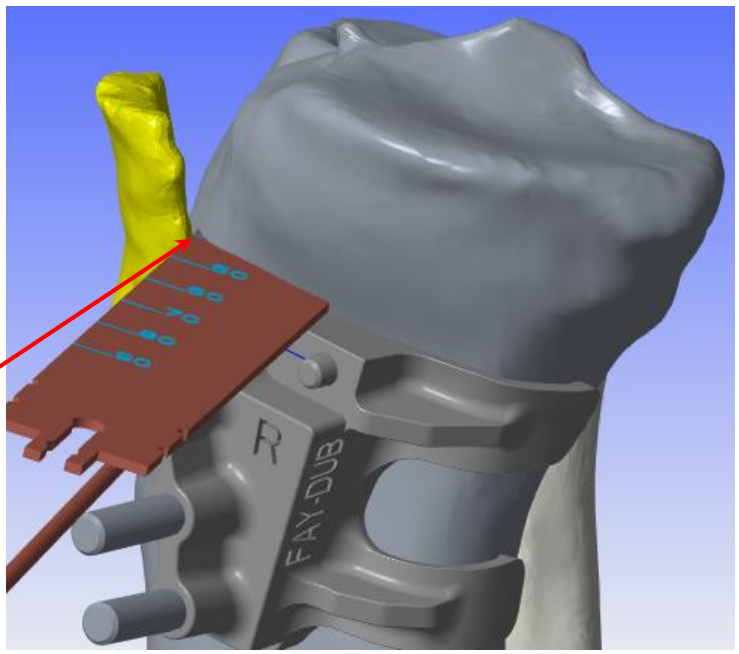


The saw blade still use the lower custom jig part for the cut direction

The K-wire is inserted to the correct value (value example here)

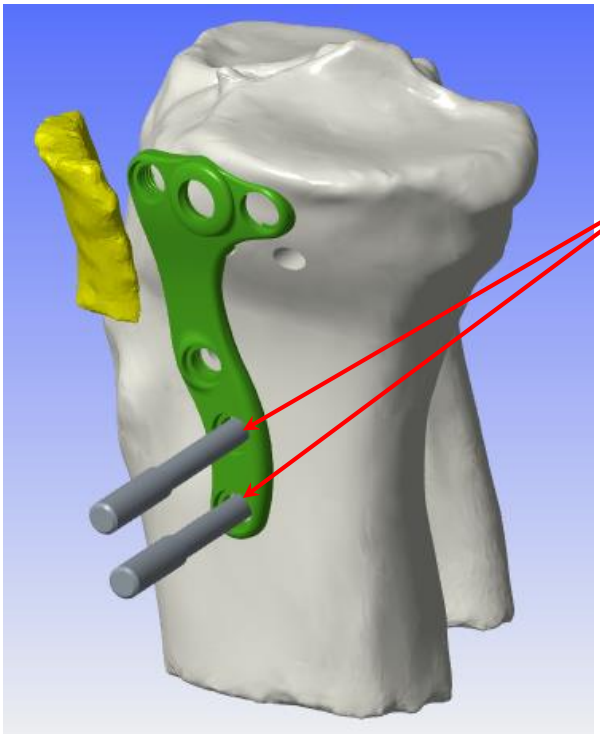
The end of the cut is done while protecting the rotular tendon, a local bi-planar cut can be done if wished (the custom jig is designed too avoid the rotular tendon insertion on the tibia).

The cut is done when the hinge point is reached arround 10 mm from external cortical and 10mm from the tibial proximal surface, or once you feel you touch the K-wire extremity with the saw blade.

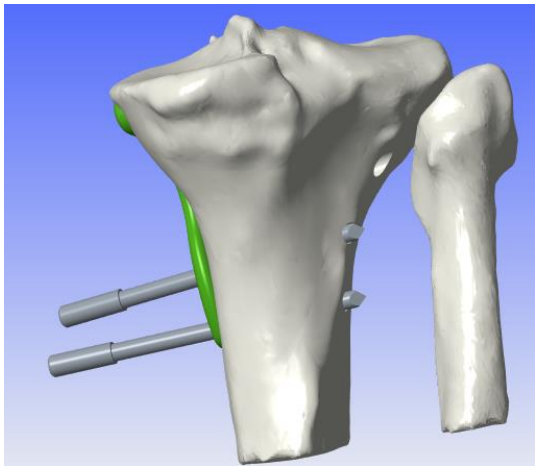


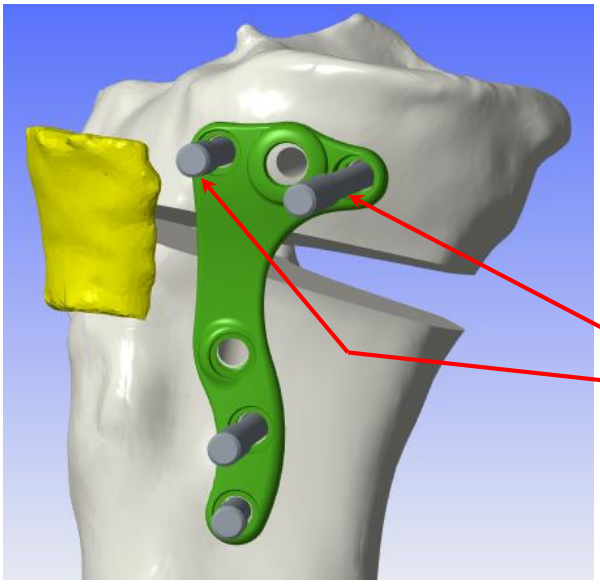
7 – Opening

- Once cut is completed, the opening can be done. In order to do so, the plate is positioned, using the 2 distal pins and carefully push the plate on the tibia so it does not move:



Do not reinsert the pins to end run on the plate, otherwise it would be too long and could create posterior damages. Mind your feeling, you must identify once you go through the second cortical, do not push further.

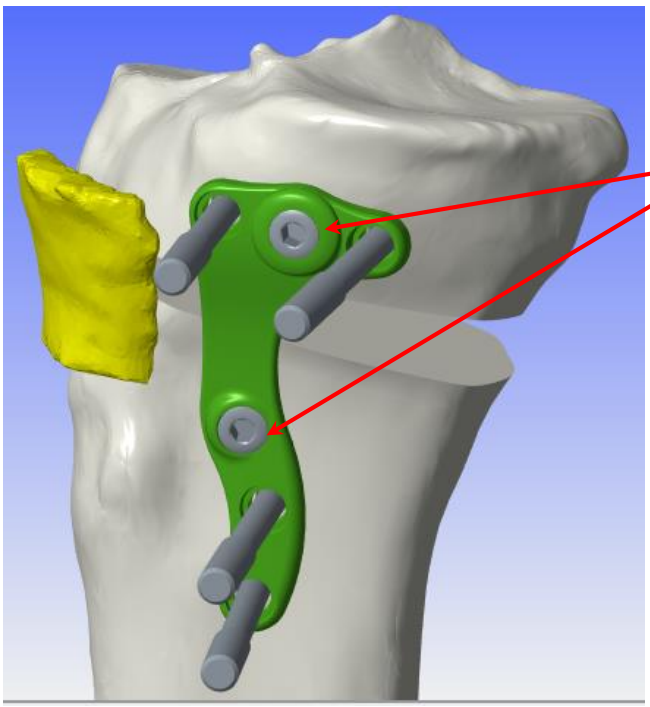




The opening is reached in both planes (HKA and tibial slope) when proximal drilled holes and the plate ones face together : the proximal pins can be reinserted in order to fix the plate and hold the opening.

8 – plate locking

- Free holes can be used to lock the plate with 2 screws while the 4 pins remain inserted :



One screw in proximal and another one in distal

The 4 remaining screws can be locked one by one into the plate removing at the same time the pins.