

presents

X-Porous TTA

Surgical technique



1. Introduction

The technique presented in this manual is devoted to joint stabilization of the stifle with rupture of cranial cruciate ligament. The technique should be performed by a licensed surgeon, trained in the specific use of the instruments and implants described in this manual. Any use different from the proposed one is at risk and under the user's responsibility.

2. Implants

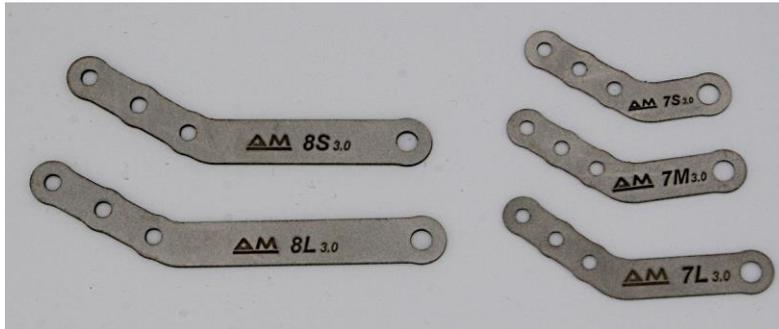
Wedges

Wedges are made of a 3D titanium net that can promote both osteoinduction and osteoconduction. Several advancements are provided, as listed in the following table. The multiple sizes of the wedges allow the surgeon to choose the one that best fits during the surgical procedure to achieve the planned advancement.

Advancement	Width
A	B
3.0	5
	7
4.5	8
	11
6.0	11
	14
7.5	14
	17
9.0	14
	17
	20
10.5	17
	20
12.0	17
	20
	23
13.5	20
	23
15.0	21
	24

Plates

Plates are made of titanium. Eight sizes are available divided in three groups according to their width: 4, 7 or 8 mm, and are curved to allow better adjustment to the tibial tuberosity. Two or three holes for insertion of screws in the tibial crest are present in the proximal part, while only one hole for screw insertion in the tibia is present in the distal part. They can be unlocked or locked, depending on the surgeon's preference and on the features of the specific procedure.



The 7 & 8 plate series, which have 3 holes for the screws in the tibial crest and one for the tibia.



Detail of the locked version of the plate.

Screws

The available screws are from 1.5 to 3.5 mm in diameter, and they can be locking or standard cortical screws, depending of their function and the preferred surgical technique.



Self-tapping screw with cross head. This is used for small diameter screws to take advantage of the low profile of the head.



Self-tapping screw with hexagonal head. This is used in bigger cortical screws.



Locking screw to be used with locking plates. This option can be used on surgeon's choice.



A locking screw locked into the plate. The screw head is not protruding over the plate surface.

3. Preoperative measurements

Using digital radiography

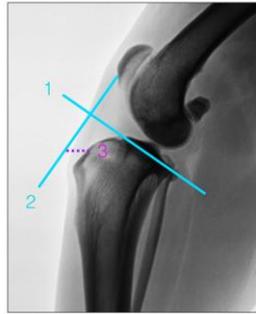
- take the X-ray projection with the stifle at 135°
- use a radiographic reference (blue circle) to adjust for radiographic magnification



- measure the TPA
- X-Porous TTA is not indicated for TPAs bigger than 30°



- STANDARD TIBIAL PLATEAU orthogonal technique
- draw the line for the tibial plateau (1)
- draw the orthogonal to (1) starting from the origin of the patellar tendon (PT) on the patella (2)
- measure the distance (3) between the insertion of the PT on the tibial tuberosity (TT) and (2)



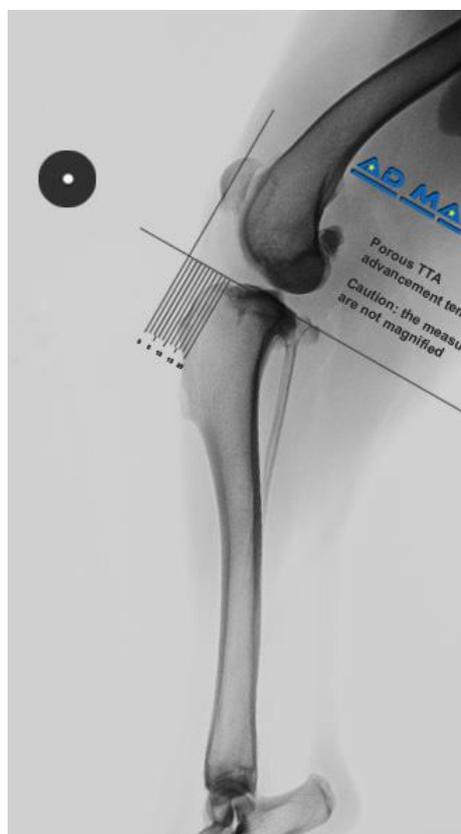
- FURTHER MEASUREMENTS
- measure the distance from the tip of the TT to the cranial part of the Gerdi tubercle

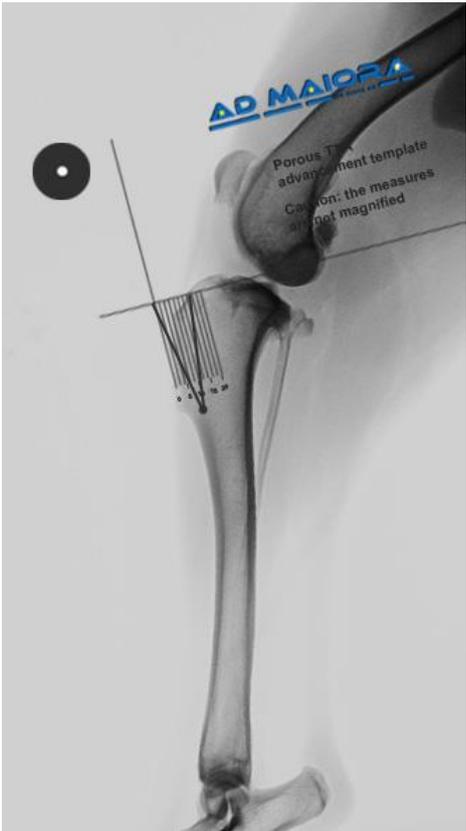


- MEASURING THE LOCATION AND EXTENT OF OSTEOTOMY
- draw the axis of the tibia (1)
- draw the line orthogonal to (1) located at the distal end of the tibial crest (2)
- locate the Gerdi tubercle (3)
- the osteotomy (4) should go from cranially to (3) to contact (2) laying on the inner side of the cortex.



Using film radiography and transparent template





4. Surgical procedure

The surgical procedure is explained step by step.

1

Positioning of the patient. Dorsal recumbency with abducted legs. The leg to be operated on should be maneuvered so that the axial alignment can be evaluated by flexing and extending the stifle. The surgical access is centered on the medial side of tibial crest.



2

The skin incision is performed about at one third of the tibial width, and extends from a couple of cm proximal to the insertion of the patellar tendon to one cm distal to the tibial crest.



3

The crural fascia is incised and retracted. This usually causes a minimal bleeding. The incision is deepened caudally to the patellar ligament insertion, allowing to enter the joint capsule.



4

The Gerdi tubercle is palpated on the lateral side of the joint. Then, a 1.5-mm K wire is inserted in the joint opening, and pushed until it can be palpated closed to the Gerdi tubercle. Use this K wire as a landmark for the most caudal point of the tibial osteotomy, which lies on the same frontal plane of the Gerdi tubercle.



5

A 1-mm K wire is inserted into the proximal tibia, close to the joint, in the same cranio-caudal position as the intra-articular wire. The limb is positioned vertically, so that its sagittal plane can be evaluated. The K wire inserted in the tibia should move in the horizontal plane. If not, it can be bent manually until it lies on the horizontal plane. This will assure that the osteotomy will be performed on the frontal plane of the tibia.



6

Insert a second 1-mm K wire in the calculated position in the distal part of the tibial crest, holding it parallel to the first one. If the surgeon prefers to perform a Maquet's hole in the distal tibial crest, the drill bit can be inserted instead of the K wire, but with the same criteria.



7

Insert the two K wires through the slot of the TTA guide. They can slide in the slot in order to find the position where the guide best fits with the tibial surface. If a drill bit is used instead of the distal K wire, it should be placed through one of the larger holes in the guide. Put the distractor underneath the patellar tendon, in order to protect it during the osteotomy procedure.



8

Usually, the guide is used just to perform the first cortical cut, and then removed to better visualize the osteotomy direction. The saw blade should be held on the same plane of the wires or drill bit. Once the osteotomy path is defined, the wires or drill bit are removed and the osteotomy completed. It is mandatory to flush with saline throughout the process to avoid bone thermal necrosis.



9

Once checked that the osteotomy is complete, the advancement of the tibial tuberosity should be performed very progressively, taking advantage of the visco-elastic properties of the bone, in order to prevent the potential fracture of the distal crest. The distractor should be positioned at the very proximal extremity of the osteotomy, to avoid any interference with the positioning of the wedge.



10

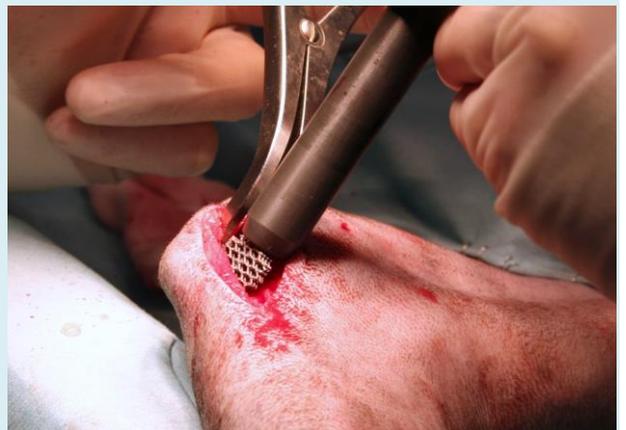
An advancement one mm larger than the scheduled wedge should be achieved. The distractor maintains the opening while the wedge is introduced. The advancement required is calculated preoperatively. The depth of the osteotomy is measured with a depth gauge and represent the width of the wedge.

Despite the fact that the calculated wedge is inserted in the osteotomy gap, an intraoperative tibial compression test should be performed, to check for any residual joint instability.



11

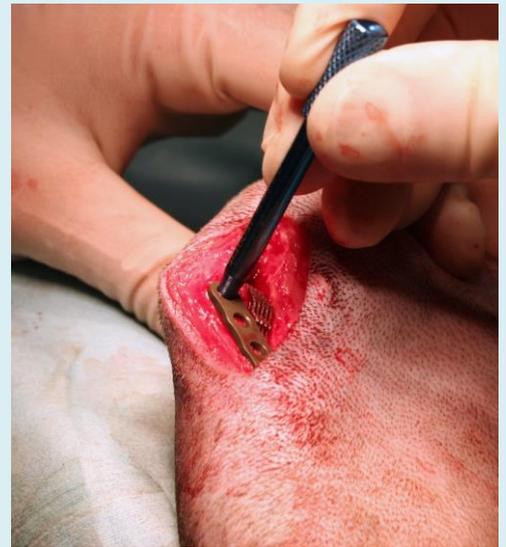
When the surgeon experiences problems in introducing the wedge, instead of keep going distracting the osteotomy, which can increase the risk of fracturing the tibial crest, an impactor can be used to facilitate its introduction. Usually a firm stroke it is enough to seat the wedge inside the osteotomy gap.



12

The tibial crest is stabilized by means of the appropriate plate. The cortical tibial screw should be placed more distal than the end of the osteotomy, and the plate's arm over the tibial crest should encompass its length, with the most proximal screw positioned just distally to the area of patellar tendon insertion.

The standard technique uses locking screws, but for the tibial screw, which is always cortical. The use of guide sleeve for the positioning of locking screws on the tibial crest is mandatory.



13

The wedge must be in contact with both the medial and lateral cortices. The proximal end of the wedge is placed below the level of the proximal tibial tuberosity, without trapping any soft tissue. Its positioning a more distal than the standard level allows for intermediate advancements compared to those of standard wedges. Never place the proximal end of the wedge more distal than the distal insertion of the patellar tendon, because this will increase dramatically the risk of crest fracture.



14

The stabilization of the plate on the tibia by means of a single cortical screw has a significant impact on the transmission of loads. In this way, the plate allows the cyclic loading of the osteotomized tuberosity, thus stimulating osteo-induction. Using NOT LOCKING PLATES, the tibial screw should be positioned first, and it should not be tightened completely. Then the most proximal screw on the crest is inserted, while manually pushing slightly on the crest. After all the screws are inserted in the crest it's possible to tighten the one on the tibia.



15

If a LOCKED PLATE is used, it should be cautiously bent in the way explained during the course. The tibial screw is inserted first and it's tightened. The plate should lay flat on the bone surface. If not, it's preferable to untighten the screw and contour the plate adequately, to avoid any leverage on the tibial crest. When the plate arm laying on the crest is flat on the bone surface, the screws are inserted in the crest, so that the plate will stay stable in the previously determined position.



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The surgical wound is sutured in a routine way. No bandage is usually applied, just an adhesive protection on the wound area.



4. Postoperative care

A period of controlled activity is required. Running and jumping should be avoided for the first 6 weeks. It is advisable to take short walks on leash.

For proper recheck of the procedure, a clinical and radiographic examination is suggested at least at two, four and eight weeks, and whenever required by the surgeon's judgment.

For further explanations and technical support, please email to

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