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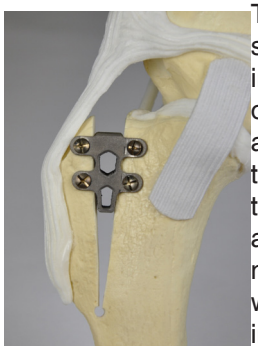
TTA RAPID

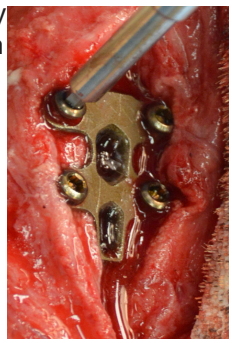
A STEP BY STEP GUIDE

Introduction

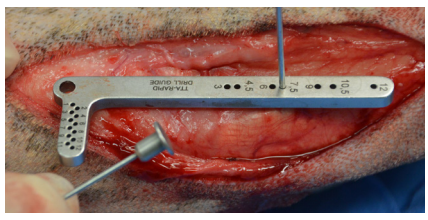
TTA Rapid is the most recent development of the original TTA technique which will be familiar to many veterinary surgeons. TTA Rapid also incorporates the best aspects of other tibial plateau levelling procedures for cruciate repair including TTO (Triple Tibial Osteotomy), MMT (Modified Maquet Technique) and MMP™. In all of these techniques the aim is to bring the tibial plateau to sit at right angles to the straight patella ligament thereby eliminating cranial tibial thrust. Where the thrust is eliminated the stifle joint is stable when loaded. However it should be noted that post-operatively the stifle is not stable to palpation.

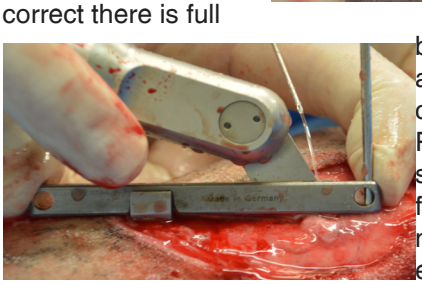


TTA Rapid is a relatively quick and straightforward technique. It does not involve the use of plates, forks, pins or wires which minimises dissection and soft tissue injury. All the surgery takes place in the proximal cranial tibia which is easily accessed. The advancement is maintained by the multi-screwed TTA Rapid cage whose unique design provides immediate stability and easy ingrowth of bone. The osteotomy is incomplete, limited by a drill hole (the Maquet hole) at the distal extent of the tibial crest. The final construct is very stable, strong enough to cope with the forces on the tibial crest. Combined with the reduced insult to soft tissues, healing is very rapid; we expect good bone ingrowth within six weeks.

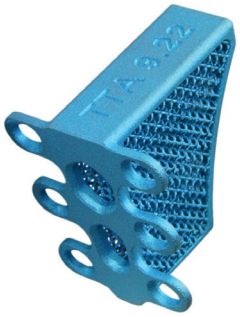


Correct positioning of the Maquet hole and the the tibial crest osteotomy is extremely important. Each cage size requires its own dedicated osteotomy to ensure that the taper of the cage matches the taper of the osteotomy. If the osteotomy is correct there is full bone/implant contact along the length of the cage. The unique TTA Rapid drill guide and saw guide are user friendly devices which minimise surgeon errors.





The TTA Rapid procedure is made possible through the development of the TTA Rapid cage. The cage is manufactured using the latest laser manufacturing techniques. The cage is effectively 3D printed from the purest medical grade titanium allowing for a complex and very strong internal architecture with very open pores. Pure titanium is currently the most biocompatable implant material we have. The laser manufacturing technique makes it possible to create the internal honeycomb structure of the cage, very similar to cancellou bone. The screw hole lugs are integrated into the cage for maximum stability. The cages are available in all standard TTA cage widths and lengths.



The step by step guide which follows details the management of a cruciate deficient stifle by the TTA Rapid technique. A video presentation of a similar case is available from Veterinary Instrumentation. Videos and animations may be found on www.vetinst.com and it is recommended that this video material is viewed along with the step by step guide.

Many thanks to Yves Samoy, DVM, PhD, University of Ghent. He has kindly supplied the images and text used in this guide.

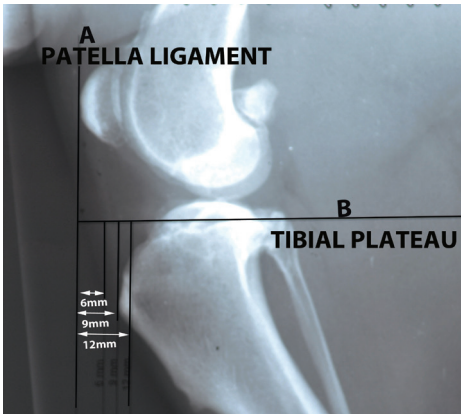
Pre-operative Assessment

Using good quality radiographs it is necessary to calculate the degree of tibial tubercle advancement which will bring the tibial plateau to sit at 90 degrees to the straight patella ligament. Several methods of calculating the required advancement are available. All have their strengths and weaknesses. The details of each technique will not be discussed here. A more detailed paper 'Assessment of the canine stifle for TTA' and relevant overlays are available free of charge from Veterinary Instrumentation or available as a download from www.vetinst.com.

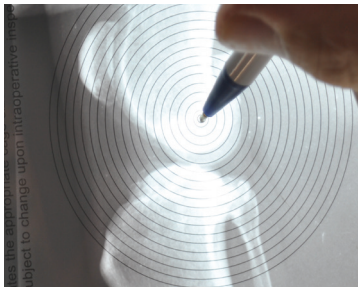
TTA Rapid Cages for advancement are available in 3, 4.5, 6.0, 7.5, 9.0, 10.5, 12.0, 13.5 and 15mm widths in a range of lengths. With the traditional method and the common tangent technique accurate positioning is key. The stifle should be in the reduced position and at a 135° flexion angle.

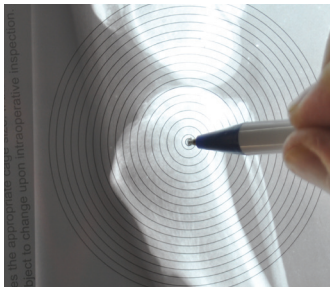
Traditional method

Using the traditional overlay place line B along the tibial plateau. Move the overlay so that line A just touches the cranial margin of the patella. It will now become clear from the scale how far the tibial tubercle must be advanced to bring it into line with the patella ligament. This case requires a 9mm cage. The TTA surgery will then realign the patella ligament to an angle of 90 degrees with the tibial plateau.

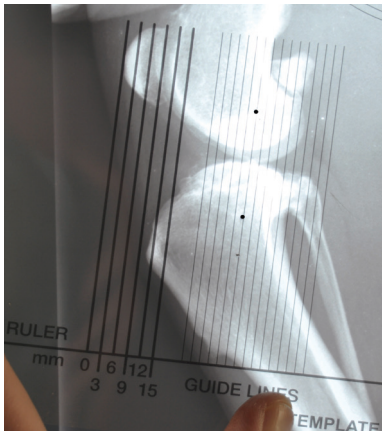


Common Tangent Method



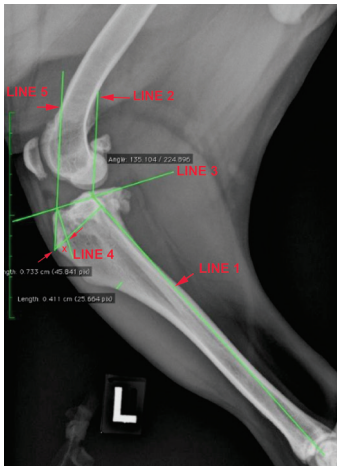


Using the common tangent overlay identify the centre of rotation of both femur and tibia. If the femur radiograph shows both condyles mark the centre of rotation of both and find a spot between the two marks.



Using the calibration of the overlay align point zero against the cranial margin of the patella. Adjust the overlay so that the marked points on the femur and tibia sit on the same guide line and measure the degree of advancement required.

Tibial Axis Method

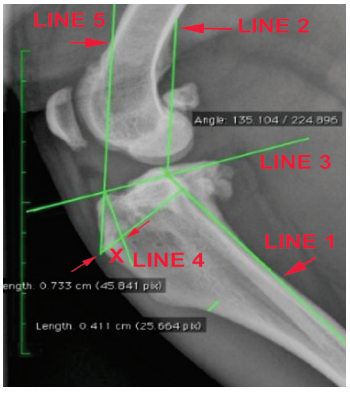


This method is based on defining the tibial plateau and is less subject to errors resulting from variable angles of extension when positioning for the radiograph.
Using a true medio-lateral projection centred on the stifle.

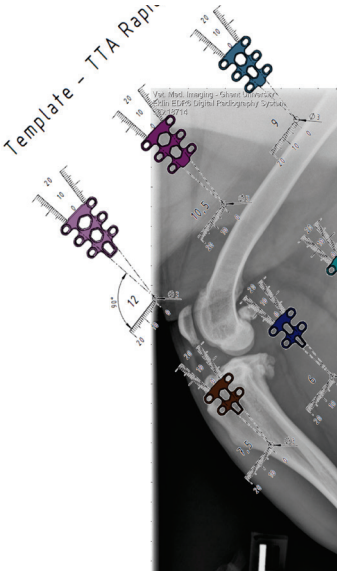
* The long axis of the limb is first defined (line 1).
* A line is then drawn (line 2) intersecting this at 135° (an approximation of the ideal flexion angle in stance) in the region of the intercondylar eminence.
* The tibial plateau is defined using another line (line 3).
* A line is then drawn perpendicular to line 3 to coincide with the most cranial eminence of the tibial tuberosity, line 4.
* Line 5 is drawn coincident with the intersection of lines 3 and 4 and parallel to line 2.
* The required advancement (X) to bring the eminence of the tibial tuberosity to line 5 is now measured perpendicular to the long axis of the tibia.

At the time of writing there is no published data comparing outcomes for the various methods. It is suggested that the surgeon select that which seems most suitable and stick with it. Surgeons switching from TTA to TTA Rapid are advised not to change their method of assessment at the same time.

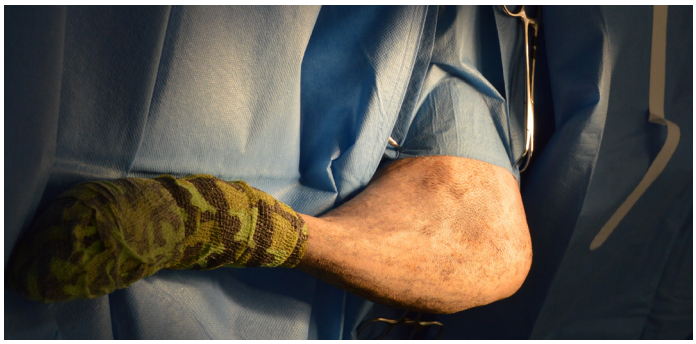
Using the Tibial Axis Method of assessment this particular case requires an advancement (X) of 7.3mm to bring the tibial plateau to 90 degrees with the straight patella ligament. The nearest available cage is 7.5mm. It is not possible to assess cage length pre-operatively. The length required will be measured after the osteotomy.



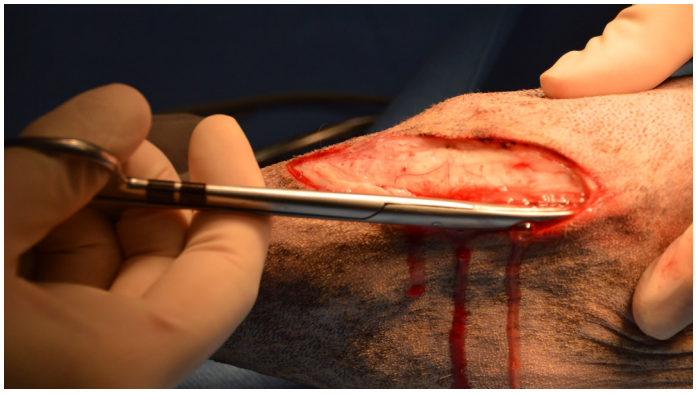
The TTA Rapid template overlay includes all the necessary information for each cage size. The template is offered up to the radiograph to confirm that the selected cage and maquet hole position are correct. Note the thickness of the cortex at the level of the Maquet hole.
The templating process gives the surgeon a good overview regarding the size and position of the osteotomy prior to surgery.



SURGICAL TECHNIQUE STEP-BY-STEP

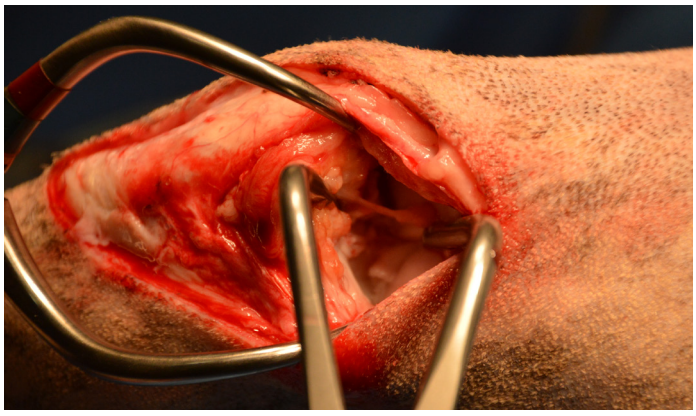


The dog is placed in a dorso-lateral recumbency. A skin incision is made on the medial aspect of the stifle extending from the level of the patella proximally to the end of the tibial crest distally.



The subcutis is dissected to expose the medial retinaculum and patellar tendon. The joint is inspected either arthroscopically or arthrotomically depending on the surgeon's preference. In this series of pictures the joint capsule was opened through a lateral incision.
A stab incision is made through the lateral retinaculum and the joint capsule (blade 11 or 15) at the region of the proximal tibia and prolonged with a scissors proximally up to the proximal pole of the patella.

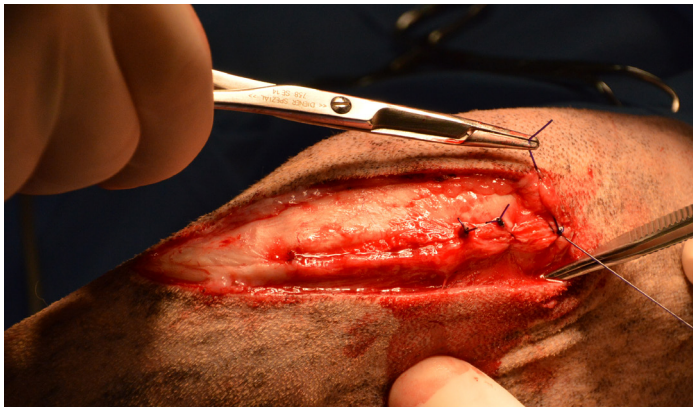
Alternatively, the joint can be approached via a medial arthrotomy. This is less traumatic for the joint, but offers slighty reduced visibility within the joint in some cases.



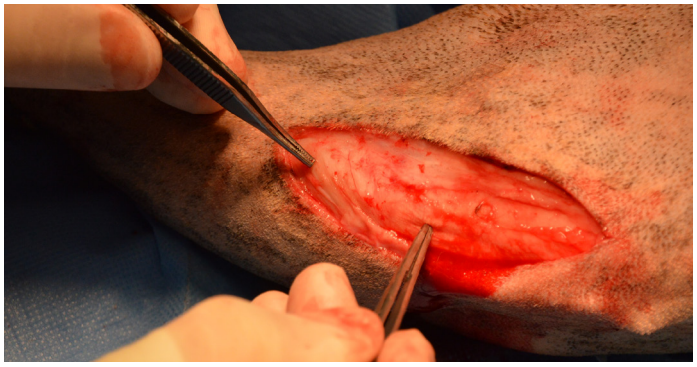
One leg of a Gelpi retractor is placed behind the tendon of the extensor muscle, the other leg is placed behind the patellar tendon. This will cause the patella to luxate medially creating access for the stifle distractor.
A stifle distractor is carefully inserted into the joint to expose intra-articular structures. It is recommended that a fine meniscus probe is used to check their integrity.

The following structures should be checked:
* Cartilage damage on the medial and lateral femoral condyle (OCD, erosion).
* Condition of the cranial cruciate ligament: check for damage / rupture – remnants of the cranial cruciate ligament are removed.
* Condition of the caudal cruciate ligament: visual estimation and palpation when in doubt.
* Condition of both menisci:
  Lateral meniscus: visualise and probe for damage.
  Medial meniscus: visualise and probe for damage.

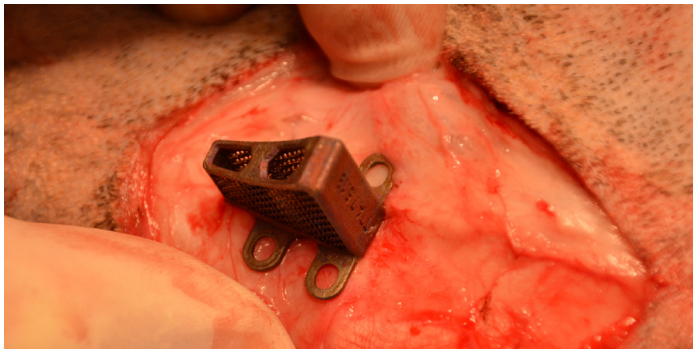
The medial meniscus is particularly prone to trauma after cranial cruciate ligament rupture due to its attachment to the medial femoral condyle.
Meniscal tears should be resected as minimally invasively as possible. In extreme cases, a partial or total meniscectomy may be required.
Depending on the surgeons' preference, a medial meniscal release may be performed with an intact medial meniscus.



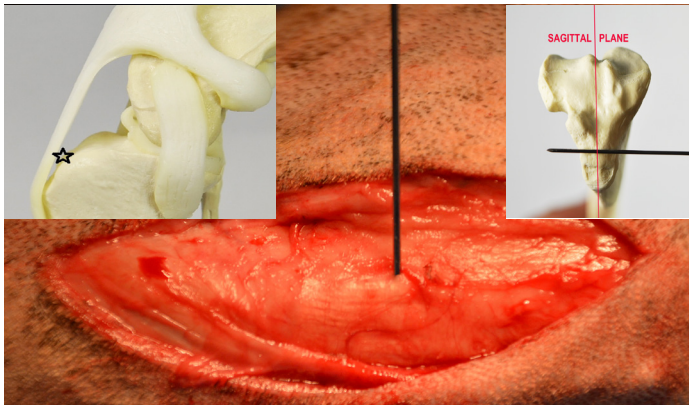
The joint is closed up with monofilament cross stitches (eg PDS®). The most distal part of the arthrotomy is left open (1 stitch) to allow advancement of the tibial tubercle.



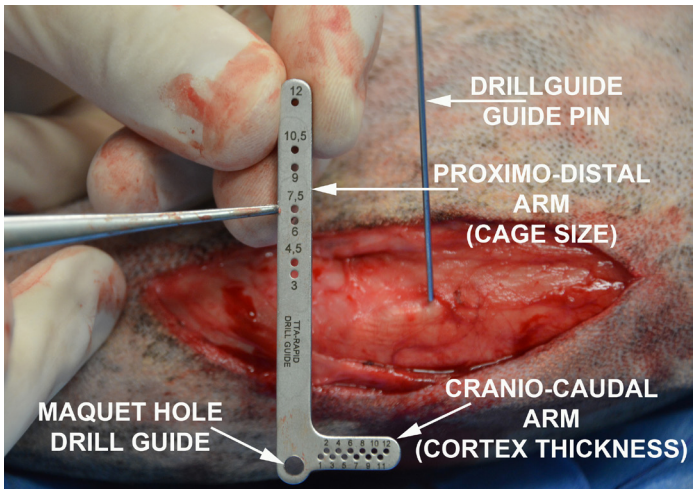
The dog is now put in a full lateral recumbency with the affected limb on the table. The position and extent of the tibial crest is identified.



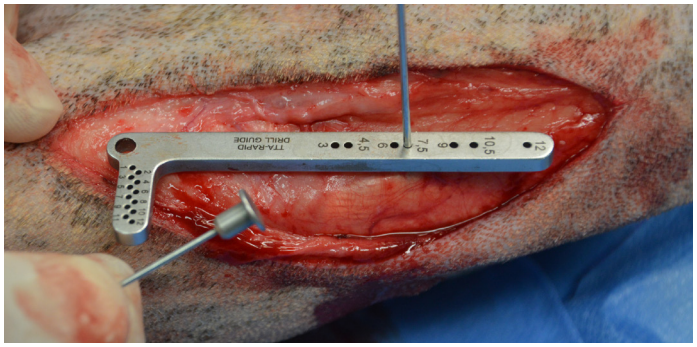
The cage selected at the pre-operative assessment is placed on the tibia to estimate the size of the cage relative to the tibia. The index finger is on the most caudal part of the proximal tibia, while the thumb is holding the cranial part of the tibial crest.
This is done as a check for measurement errors. The cage should look proportionate.



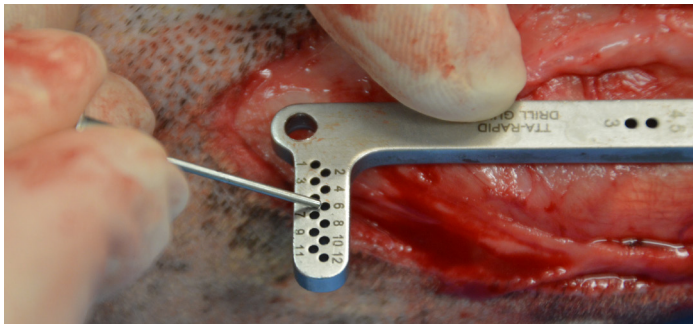
A 1.2mm pin is placed through the infrapatellar bursa, located just above the surface of the proximal tibial.
The pin is pushed completely through the joint capsule from medial to lateral. This pin functions as the proximal anchoring point of the drill guide and represents the position the proximal limit of the cage. The pin should be placed at right angles to the sagittal plane of the stifle. Not at right angles to the medial tibia surface.The location and plane of insertion of this pin is very important as it ultimately dictates the position of the osteotomy.



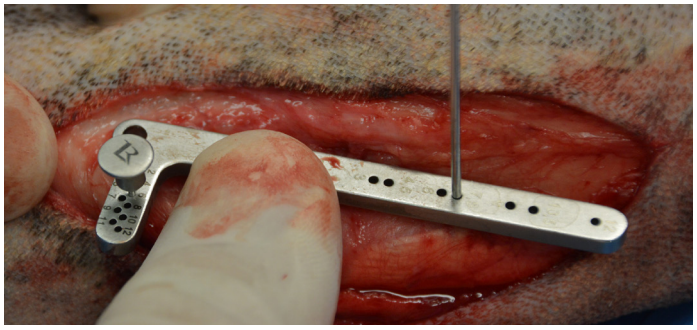
Use of the TTA Rapid drill guide is a key part of the procedure. Using measurements from the pre-operative assessment the drill guide ensures that the Maquet hole is placed in the correct position proximo-distally and in the correct position relative to the cranial cortex. Success of the procedure depends on the correct positioning of the Maquet hole.



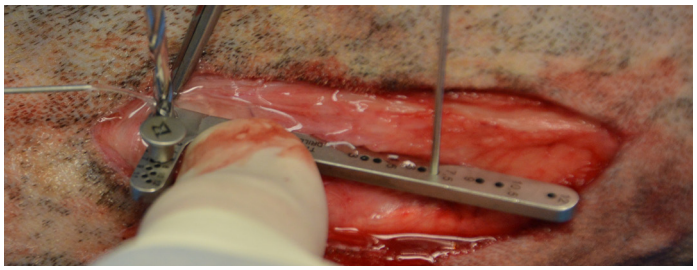
The long arm of the drill guide is slid over the pin, using the hole that corresponds with the selected cage size from the pre-op assessment. In this case a 7.5mm advancement was required, so the pin is, therefore, placed through the 7.5 hole. The drill guide hole is now correctly positioned proximo-distally.



The Maquet hole should be placed just behind the cranial cortex of the tibia. The cranio-caudal position of the hole is determined by the measured thickness of the cranial cortex. In this case the cranial cortex is 6mm and the pin is placed in the 6mm hole and pushed against the tibial crest.



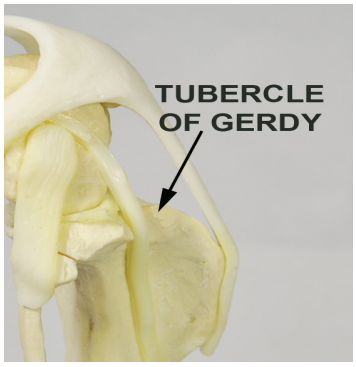
With both pins in position the location of the Maquet hole is fixed. The drill guide pin additionally gives an indication for the require angle of the drill hole.



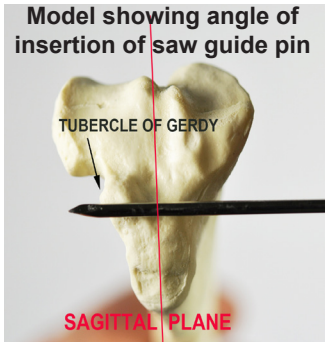
The size of the Maquet hole is important. The role of the Maquet hole is to limit the length of the osteotomy. Loading is spread around the circumference of the hole allowing the bone to hinge. The hole should be proportionate to the patient to ensure that the hole functions as it should without removing too much bone which would weaken the tibia. The Maquet hole also functions as the distal location point for the saw guide. Standard drill sizes for the saw guide are 2.0 or 3.0mm.

The use of a 2.0mm drill bit is advised in most dogs. The 3.0mm drill bit is reserved for giant breeds. In very small dogs even 2.0mm may be too large. In these cases the maquet hole may be drilled with a 'K' wire or arthrodesis wire which will subsequently act as the distal locator for the saw guide. It is suggested that these very small dogs should not be managed by TTA Rapid until the surgeon has some experience of the procedure.
The drill bit is positioned parallel to the drill guide pin.
Use irrigation to minimise thermal necrosis at the Maquet hole.
Once the Maquet hole is drilled, the guide can be removed.

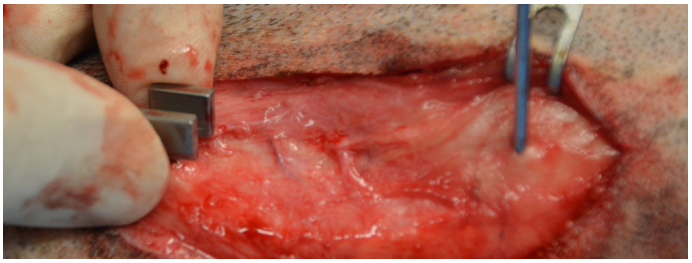
The TTA Rapid saw guide is designed to ensure that the tibial crest osteotomy is made in the correct position, the correct length and in the correct plane for the selected cage. As with the saw guide a guide pin is pre-placed to make sure that the guide is positioned in the right place with the right orientation.
The saw guide comprises two components. The long slotted component directs the saw blade and the short 'shoe' holds the slotted portion in alignment with the Maquet hole. The shoe has a short peg which locates in the Maquet hole. The peg has a 'U'shaped cut out to allow the saw to enter the center of the Maquet hole. It is important the the 'U' on the peg is directed proximally.



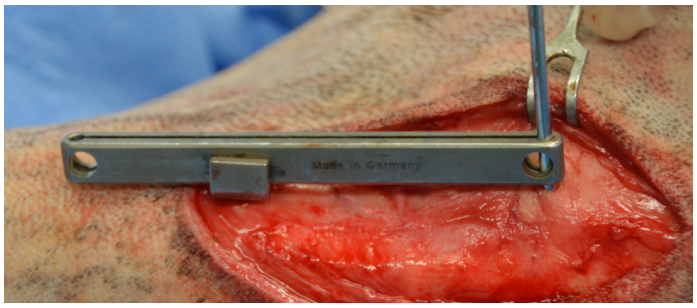
On the lateral side of the proximal tibia, palpate Gerdy's tubercle. The tubercle is located approximately 1/2 of the width of the tibia back from the crest. Gerdy's tubercle forms the cranial margin of the groove containing the long digital extensor tendon. A 2.5mm pin is placed just cranial to Gerdy's tubercle. The pin should penetrate the entire joint from the medial side exiting on the lateral side. Ideally, the pin is placed just in front of the tubercle.



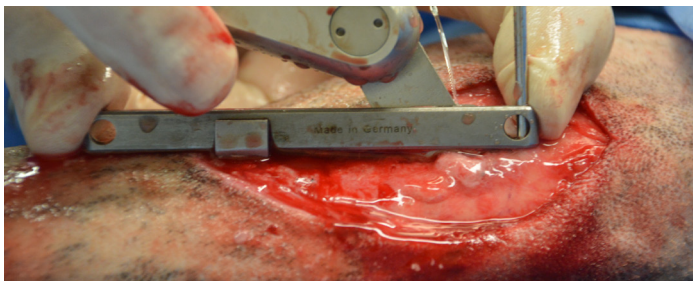
The plane of the osteotomy is not perpendicular to the bone surface but rather at right angles to the sagittal plane of the stifle. The saw guide pin is placed in this plane which is usually close to being at right angles to the table top. It should be the same plane as the Maquet hole.

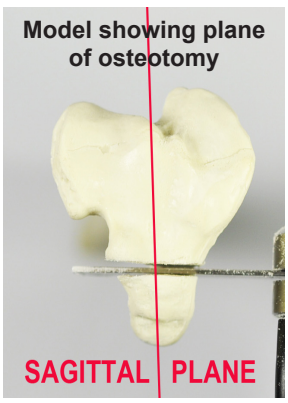


The shoe part of the saw guide is placed into the Maquet hole. Make sure that the shoe peg corresponds to the Maquet hole size. Also ensure that the 'U' cutout on the peg faces proximally to allow the saw blade to run into the Maquet hole.

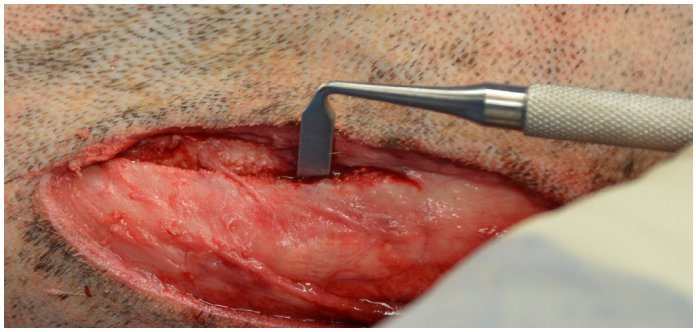


The saw guide is placed over the guide pin and the body of the guide is placed into the shoe. The line and angle of the osteotomy is now fixed.
Saw blades with a cut thickness of up to 1.0mm (Blade thickness at the teeth) may be used through the saw guide to create the osteotomy.

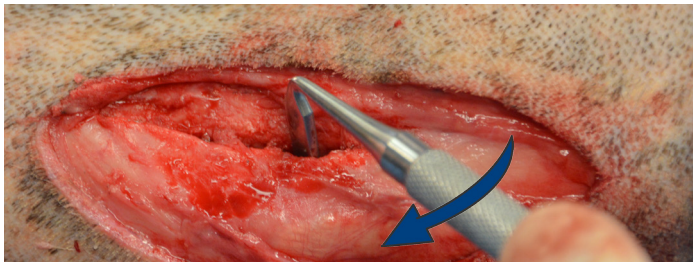




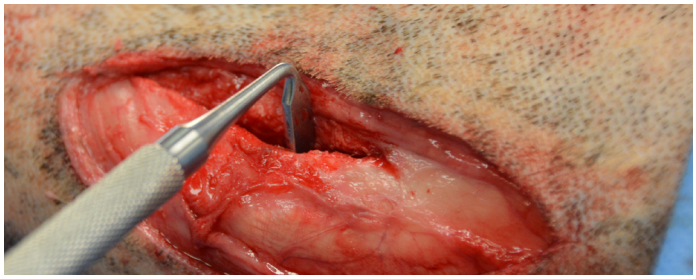
The Guide is held in place as demonstrated in the image above. No additional forceps are required. Note that the osteotomy is not created at right angles to the bone surface of the medial tibia
Lubricate liberally to prevent thermal necrosis.
Once the osteotomy is complete, the saw guide along with the pins are removed.



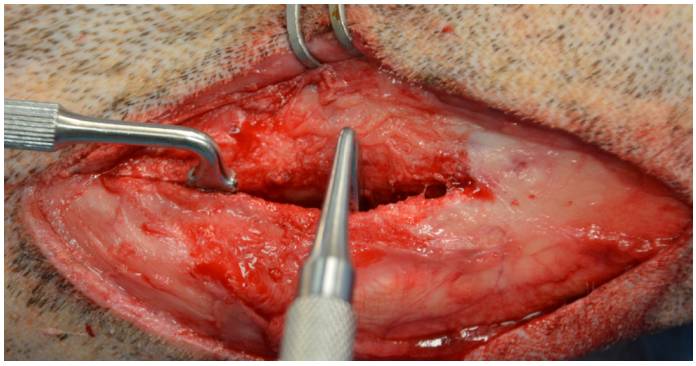
The thin part of the 3mm spreader is inserted in the most proximal part of the osteotomy.



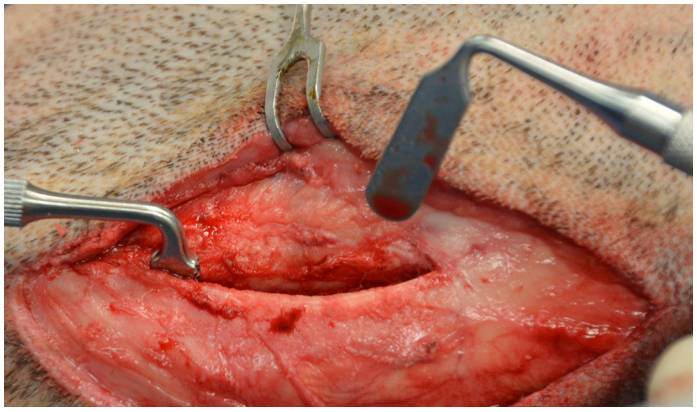
The stifle is placed in full extension. This will minimise tension from the patella ligament on the tibial crest and make it easier to open the osteotomy. Very gently turn the spreader downwards to create an advancement.
It is very important that the osteotomy is opened slowly and that at each stage the hinge is allowed time to adjust. The spreader handle should always be rotated down towards the foot as the friction will push the tibial crest towards the hinge. Rotating the handle upwards creates tension at the hinge which may contribute to hinge failure.



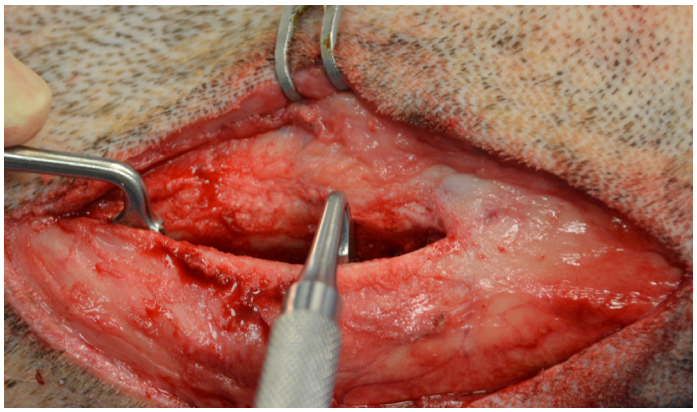
When the spreader is turned 90° clockwise, the advancement is maximum for the spreader in use. (3mm in this case).



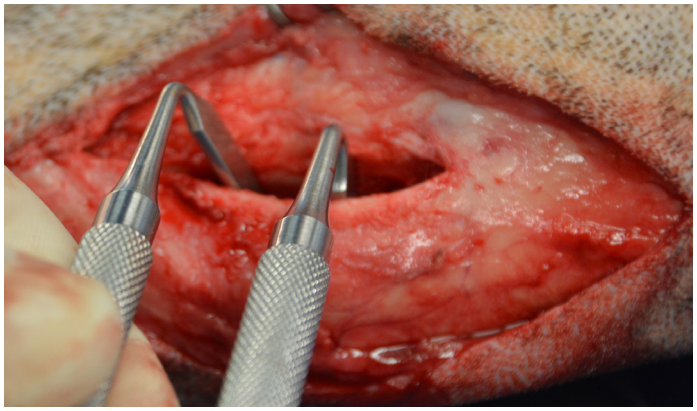
To keep the osteotomy open, the thin part of a second spreader is pushed into the distal end of the osteotomy. NEVER USE THIS SECOND SPREADER TO OPEN UP THE OSTEOTOMY AS IT WILL RESULT IN THE AVULSION OF THE TIBIAL CREST!



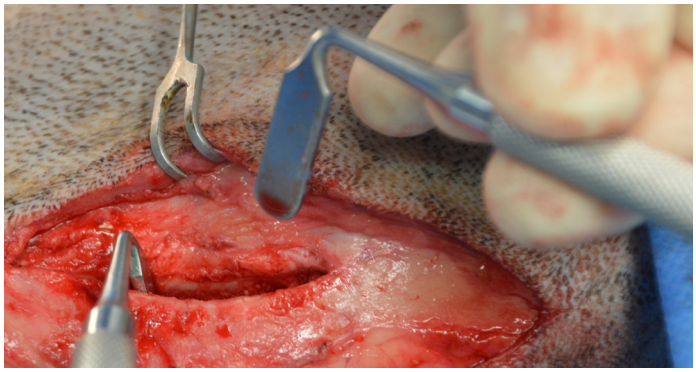
The original 3mm spreader may now be rotated and removed from the osteotomy. The next size spreader (6mm) is now introduced and rotated slowly and steadily downwards. As the osteotomy opens the distal spreader maintaining the gap will become loose and should be moved more distally.



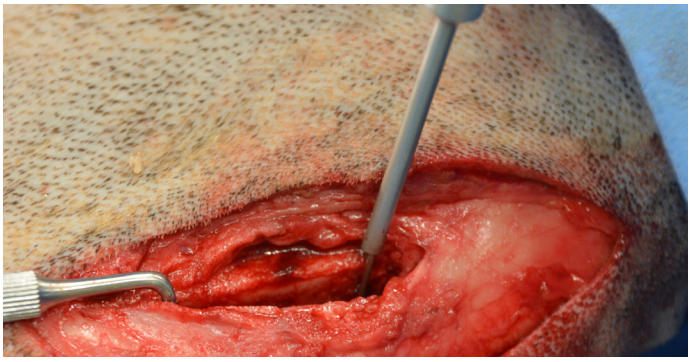
At 90 degrees the spread is now 6mm and the distal spreader is re-positioned to hold the osteotomy open.



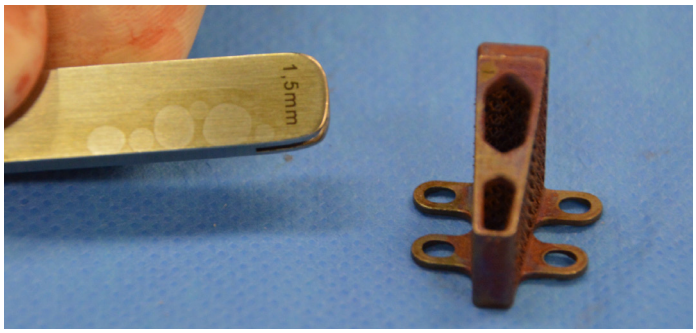
It is permissible to use the broader part of the distal spreader to hold. Again do NOT use the distal spreader to open the osteotomy.
By sequentially introducing larger spreaders the osteotomy is gradually opened up ready to accept the cage. This is the only stage of the procedure which should not be ‘rapid’.



The opening spreader is removed and a 6 – 7mm advancement has been achieved.
With only a 1.5 – 2mm to go, the advancement is almost complete. At this point, preparations are made to fit in the cage into the osteotomy. While doing this, the bone is given some time to relax and adapt to the new situation. The final advancement will be made just prior to cage insertion.

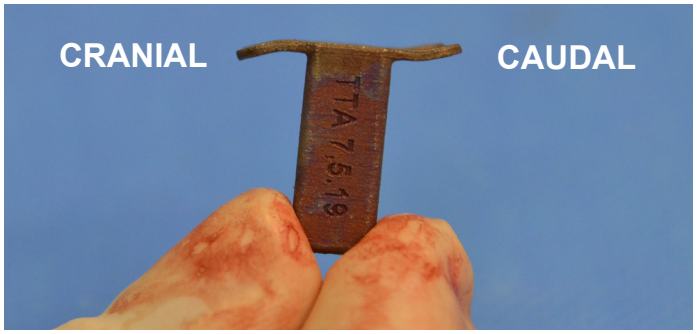


The depth of the caudal cut surface of the most proximal tibia is determined with a depth gauge. It is not possible to predict exactly from the pre-operative radiographs the required length of cage. Each type of cage has 3 different depth sizes. Select the shortest cage which will support both medial and lateral cortices.

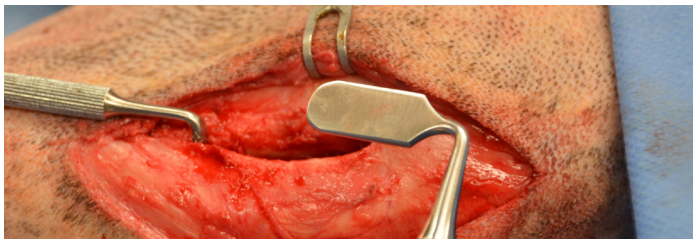


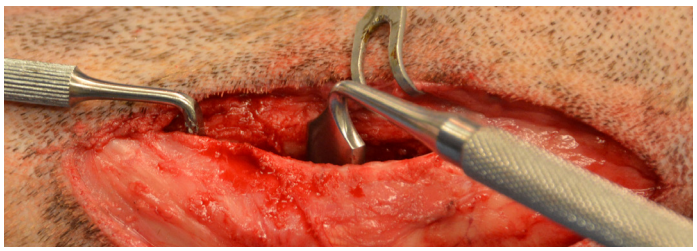
A special bending iron is used to bend the cage ears. The 1.5mm slot is preferred.

The cranial ears are bent down a little and the caudal ears are bent up a little as shown. It is worth spending a little time to get the orientation of the cage correct as bending the ears the wrong way may lead the breakage when bent back the other way.

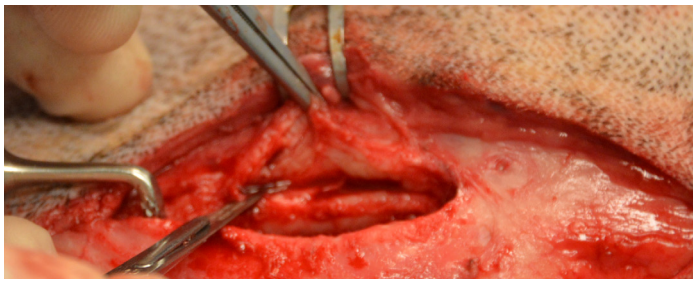


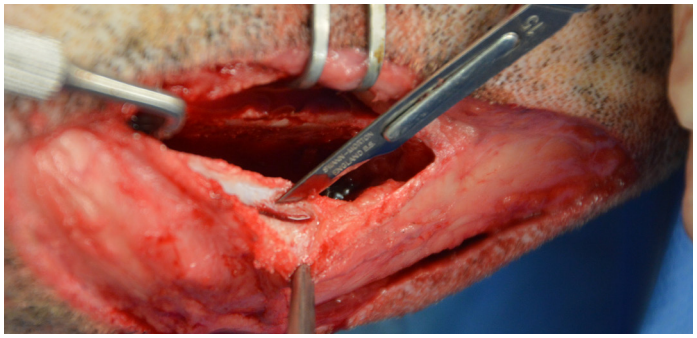
Prior to insertion the cage appears as shown.



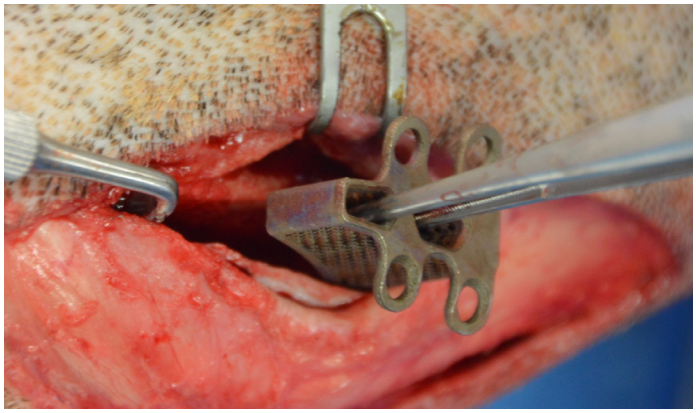


The final advancement is achieved using the 9mm spreader. In that only 7.5mm of advancement is required the 9mm spreader is rotated only part way before the osteotomy is held fully open by adjusting the distal spreader.

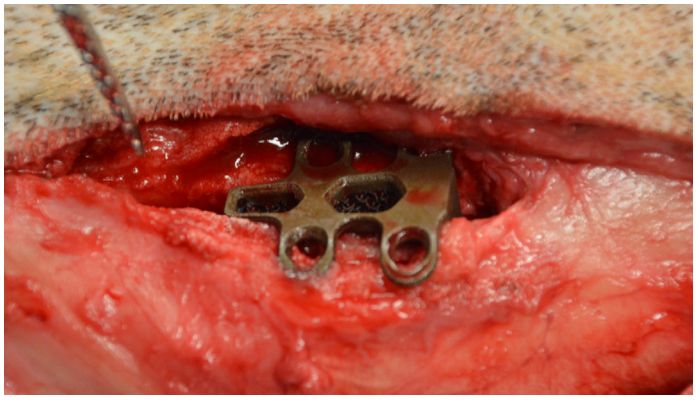




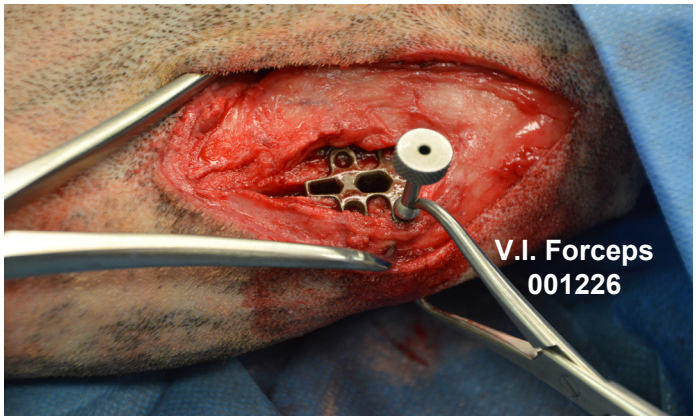
The fascia and periosteum is elevated cranially and caudally around the proximal osteotomy. Only the area where the ears will be seated needs elevation.



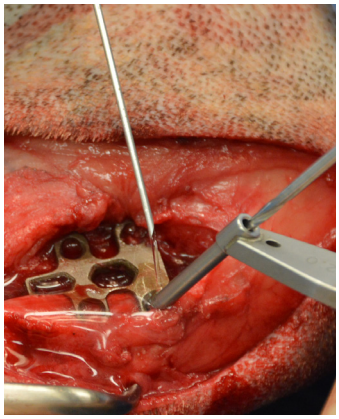
The cage is eased into position. To ensure maximum contact between the sides of the cage and bone the top of the cage should sit 3-5mm below the top of the osteotomy.

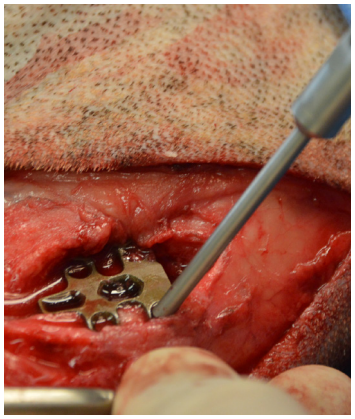


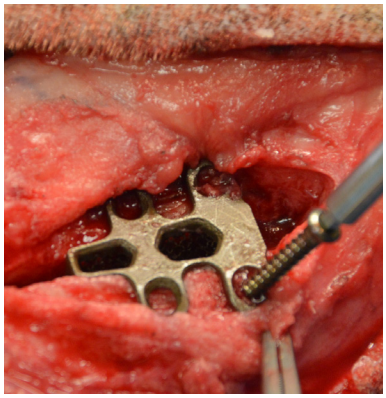
The cage is pushed home digitally and the second, ‘holding’ spreader removed.



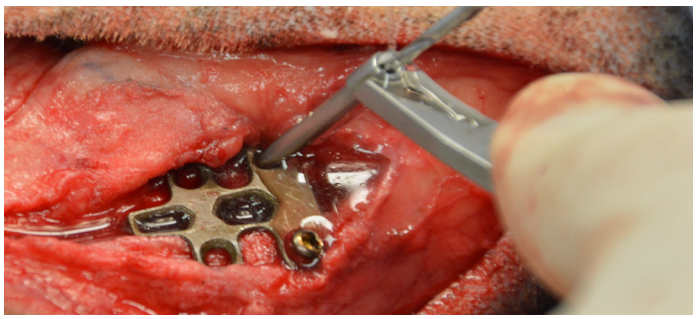
Reduction forceps are used to seat the cage ears individually. The V.I. 2.4/2.7 plate holding forceps fit the ears nicely.
In cases where the surgeons suspects that the hinge has cracked, large spin lock reduction forceps are employed to compress the cage within the osteotomy. The cage screws securely hold the construct together. Pins and tension band wires are not required.



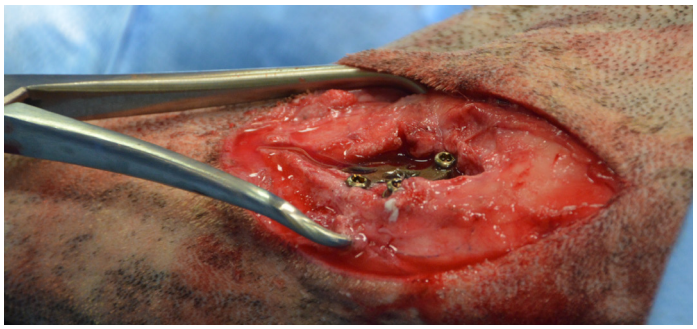




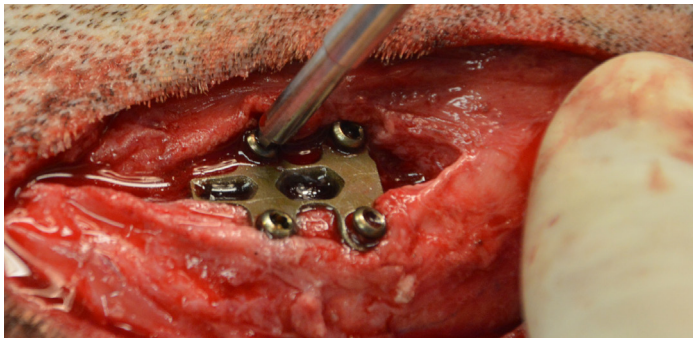
The screws are inserted in a zig zag pattern. The first screw is the most proximal cranial screw, then the most proximal caudal screw and so on. The cranial screws are inserted proximo-distally (as are the forks in the standard TTA procedure) to counteract the pull of the quadriceps complex.
All the screws are 2.4 titanium self tapping screws requiring a 1.8mm pilot drill. Measure the screwhole to ensure that both cortices are penetrated. Because of the angulation of the screw the length required will be hole depth plus 4mm. Note that the screws are 2.0 hex drive requiring the TTA Rapid screwdriver **TTAR20342420.**



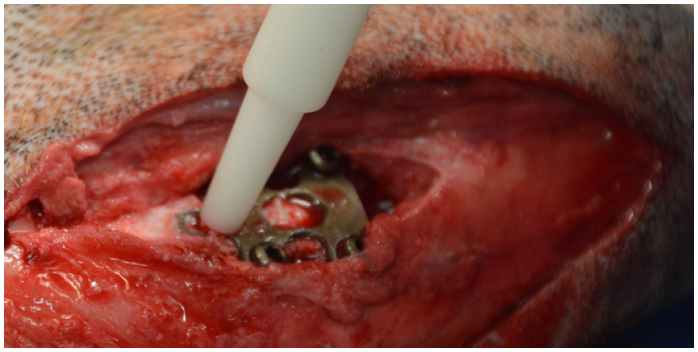
The caudal screws are angled away from from the osteotomy in a cranio-proximal/caudo-distal fashion



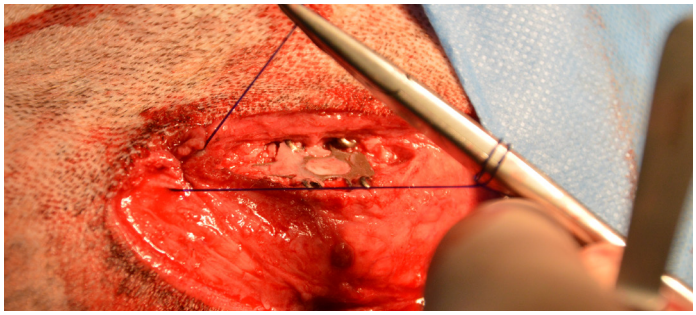
Once all the screws are in place any reduction forceps may be removed.



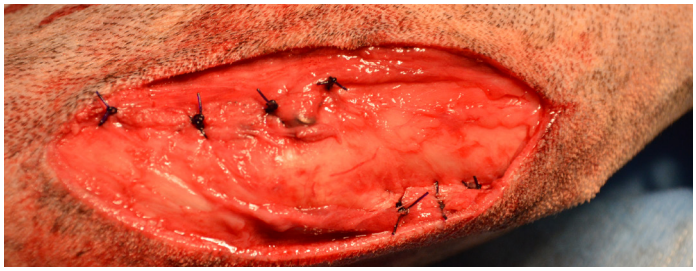
All screws are carefully tightened.



As an option to decrease healing times either an autograft or hydroxy-apatite paste (V.I. NanoPaste) may be placed in the cage and the osteotomy distal to the cage.



The fascia is closed with cross stitches (eg PDS®) starting distally. Since the soft tissue was not elevated from the bone, it is often not possible to cover the entire implant with the fascia.

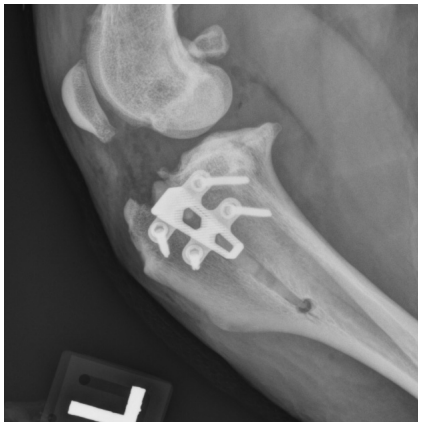


Check and make final closure of the arthrotomy

Subcutis and skin are closed according to surgeon prefrence

A light dressing is applied for 3-5 days.

Take well positioned radiographs and check the post operative angles and position of cage and screws.



4 week follow up radiograph. Note significant filling and consolidation in osteotomy.

Post-Operative Care

Care of the TTA Rapid patient post-operatively is extremely important. Despite the inherent stability of the TTA Rapid construct the repair is vulnerable until the osteotomy has filled and consolidated. The patient is usually kept in the hospital overnight on appropriate analgesia. The patient is checked in 10 days with a clinic evaluation at 6 weeks. For the first six weeks post-operatively strict leash exercise is essential for a maximum of 5-10 minutes per session. Hydrotherapy should be encouraged. Between six weeks and the three month follow up radiograph exercise may be gradually increased but still on the leash.If the 3 month radiograph shows filling of the osteotomy then off lead exercise is permissible, initially 10 minutes at the end of a walk. Exercise is gradually increased back to normal.

VI Black Series Battery Powered Surgical Saw and Drill

The VI Black Series range of power tools have very robust steel construction, with German motors and adjustable speed triggers making them much smoother, quieter and more reliable than many other models.

Based on hand surgery power tools, these are smaller than the standard human surgery power tools used for more general orthopaedics and are well suited to our patients. Their size also makes them ideal for travelling surgeons and for other situations where space is at a premium.

VI Black Series Battery Powered Drill

Supplied complete with Battery, Battery Charger, Battery Transfer Sleeve and Aluminium Storage Case.

The VI Black Series Range is fully autoclavable at 134˚C (not batteries) and is small enough to fit inside larger autoclave bags.

The Drill has a reverse and is fitted with a standard 3 jaw 'Jacobs' Style Chuck with through cannulation.

Drill max speed: 0-1100RPM
Drill max noise: <40dB
Drill weight: 990g

VI Black Series Battery Powered Saw

We currently stock a range of 9 Blades for the Saw which have been specifically selected for our patients. Ideal for TTA cruciate surgery and excissional arthroplasty
Supplied in an Aluminium Storage Case.

Saw speed: 0-15000 osc/min

Saw max noise: <50dB

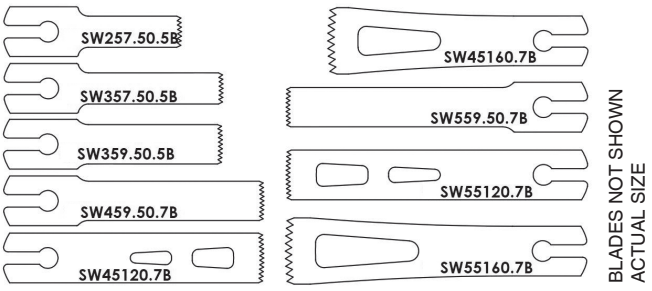
Saw weight: 782g

VI Black Series Battery Powered Drill/ Saw Set

Drill/ Saw Set

-Black-Line Drill
-Black-Line Sagittal Saw
-2 x Battery Chargers
-2 x Batteries
-2 x Battery Transfer Sleeves
-Supplied in Aluminium Storage Cases.

VI Black Series Saw Blades



VI has designed the range of Black Series Blades for commonly encountered small animal orthopaedic procedures. They fit the Black Series Handpiece and are well suited to the tibial osteotomy procedures that use linear cuts in the treatment of canine cruciate disease.

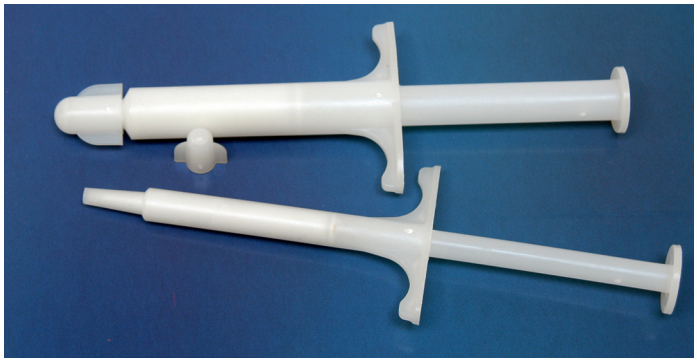
VI BLACK SERIES BATTERY POWERED SURGICAL DRILL AND SAW	
BLACKDRILL	VI Black Series Drill Set
BLACKSAW	VI Black Series Saw Set
BLACKKIT	VI Black Series Drill/ Saw Set
BLACKBAT	VI Black Series Spare Battery
BLACKDRILL-SC	VI Sterilisation Case for Drill
BLACKSAW-SC	VI Sterilisation Case for Saw

NanoPaste Bone Substitutes

The addition of osteoconductive bioceramic hydroxyapatite to an orthopaedic site can significantly decrease healing times. NanoPaste is available as two presentations.

NanoPaste. The sterile presentation is an aqueous paste supplied in a syringe (2.5ml or 5.0ml). The paste may be injected directly into a defect where it conforms to fill the space. The paste is readily colonised by bone cells and acts as a scaffold encouraging penetration of host bone. The putty-like consistency means that the paste may be pressed onto bone where it sticks until resorbed. NanoPaste is very similar to Ostim™ which has an established clinical record.

Applications include: joint arthrodesis, TTA, non-unions, delayed unions and filling spine cages.



NanoPaste and TTA/TTA Rapid

Use to save time harvesting autograft or when the quality of the autograft is poor. NanoPaste will extend autograft.
NanoPaste may be injected directly into the defect where it conforms to the defect shape.
Nano HA paste conforms to ENISO 13779-1:200 and ASTM F1185-88 for medical grade HA.

NanoPaste is also available in a granule formulation 'ReproBone' which may be used alone or as an extender of natural cancellous bone graft.

NANOPASTE	
PAS2.5	NanoPaste Syringe 2.5ml
PAS5	NanoPaste Syringe 5ml

TTA Rapid is manufactured in Germany by

RITA LEIBINGER MEDICAL

TTA RAPID INSTRUMENTS

TTA RAPID INSTRUMENTS	
TTAR132403000	TTA Rapid Drill Guide
TTAR132405000	TTA Rapid Saw Guide
TTAR132402000	TTA Rapid Bending Iron Double-ended
TTAR10386300	TTA Rapid Screwdriver Handle AO Coupling
TTAR20342420	TTA Rapid Screwdriver Shaft for 2.4 Hex AO Fitting 100mm
TTAR20346424	TTA Rapid Holding Sleeve for 2.4 Hex Screws
TTAR132400013	TTA Rapid Lever Spreader Double-ended 3mm & 9mm Broad
TTAR132401013	TTA Rapid Lever Spreader Double-ended 6mm & 12mm Broad
TTAR164005016	TTA Rapid Plate Holding Forceps Angled 160mm
TTAR164242735	TTA Rapid Depth Gauge 40mm 150mm
TTAR164007024	TTA Rapid 2.0/2.7 Sleeve/ Guide for 1.8mm Drill
TTAR2103624	TTA Rapid 2.4mm Screw Rack for 6-40mm Screws Supplied empty
TTAR132500000	TTA Rapid Implants Box Supplied empty
TTAR132500010	TTA Rapid Instruments Box Supplied empty

TTA Rapid Sagittal Saw

Veterinary Instrumentation currently offers four surgical saw options suitable for TTA Rapid. The four options are the multi saw , the VI Black series, the MiniDriver and the MaxiDriver. A selection of blades is available for TTA Rapid.

Please note a blade thickness of 1mm or less is required for the TTA Rapid Saw Guide.

NanoPaste Bone Substitutes

NanoPaste and TTAR

Use to save time harvesting autograft or when the quality of the autograft is poor. NanoPaste will extend autograft.

NanoPaste may be injected directly into the defect where it conforms to the defect shape. NanoPate may also be injected into the cage.

Nano HA paste conforms to ENISO 13779-1:200 and ASTM F1185-88 for medical grade HA.

NanoPaste is also available in a granule formulation 'ReproBone' which may be used alone or as an extender of natural cancellous bone graft.

NANOPASTE	
PAS2.5	NanoPaste Syringe 2.5ml
PAS5	NanoPaste Syringe 5ml

TTA RAPID INSTRUMENTATION

TTA RAPID DRILL GUIDE

The Drill Guide is an L shaped device developed to facilitate the correct positioning of the Maquet hole during the TTA Rapid procedure. The vertical arm of the guide carries numbers which correspond to the size of the cage which dictates the length of the osteotomy. The horizontal arm carries a scale representing the thickness of the cranial cortex of the tibia.
This is supplied with a guide pin, and is used in conjunction with a 1.2mm 'K' or 'A' Wire.

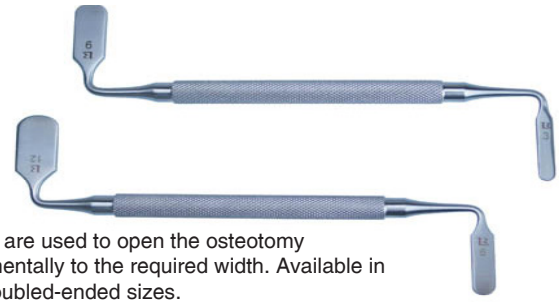
TTA RAPID DRILL GUIDE	
TTAR132403000	TTA Rapid Drill Guide

TTA RAPID SAW GUIDE

The Saw Guide has been developed to ensure a sufficiently large cranial fragment is created for screw placement. Use of the guide ensures that the osteotomy is paced in the correct position and the correct plane.The Saw Guide consists of two pieces. The Saw Guide itself has a 1.5mm hole at one end and a 2.5mm hole at the other end and is slotted, the second part is an anchoring device or shoe, which retains the guide itself, which is placed in the Maquet hole. This peg is slotted to allow the cut to reach the Maquet hole, and is supplied with a 2mm anchor for most cases and 3mm for use in the biggest patients. The 1.0mm slot permits use of saw blades with a maximum cut thickness of less than 1.0mm.

TTA RAPID SAW GUIDE	
TTAR132405000	TTA Rapid Saw Guide

TTA RAPID LEVER SPREADER



These are used to open the osteotomy incrementally to the required width. Available in two doubled-ended sizes.

TTA RAPID LEVER SPREADER	
TTAR132400013	3mm & 9mm TTA Rapid Lever-Spreader Double-ended
TTAR132401013	6mm & 12mm TTA Rapid Lever Spreader Double-ended

TTA RAPID BENDING IRON

This is used for contouring the cage ears for accurate placement.

TTA RAPID BENDING IRON	
TTAR132402000	TTA Rapid Bending Iron

TTA RAPID 1.8/2.0 SLEEVE/GUIDE for 1.8MM DRILL

TTA RAPID 1.8/2.0 SLEEVE/GUIDE FOR 1.8MM DRILL	
TTAR164007024	TTA Rapid 1.8/2.0 Sleeve/Guide for 1.8mm drill

TTA RAPID CONVERSION KIT

This Kit will appeal to the surgeon who is experienced with TTA or similar techniques, and would like to add the basics for TTA Rapid to an existing setup. It does not include a storage case.

Kit contains:

TTA Rapid Saw Guide Complete

TTA Rapid Drill Guide Complete

TTA Rapid Lever-Spreader Double-ended 3 and 9mm

TTA Rapid Lever-Spreader Double-ended 6 and 12mm

One of each size of Cage from 4.5/12 to 12/28 (total 18)

3mm Cages are also available but not included in this Starter Kit.

The kit price is discounted by over 10% compared to the component price.

TTA RAPID STARTER KIT	
TTARSTART	TTA Rapid Conversion Kit
TTARMIN	TTA Rapid Conversion Kit - Instruments Only

TTA RAPID PREMIUM INSTRUMENT AND IMPLANT KIT

The Complete Instrument and Implant Kit is supplied in 2 Autoclavable Trays, allowing easy use, convenient storage and easier replenishment of consumables.

The Kit contains a full set of the required instrumentation in one tray, plus two of each Cage from 3mm to 12mm, (42 Cages in total) and 5 each of 2.4mm Titanium Screws from 6 to 40mm (90 in total) in a second implant tray.

Instrument Kit Tray contains:

TTA Rapid Saw Guide Complete

TTA Rapid Drill Guide Complete

TTA Rapid Lever-Spreader Double-ended 3 and 9mm

TTA Rapid Lever-Spreader Double-ended 6 and 12mm

TTA Rapid Bending Iron

Twist Drills 1.8, 2 and 3mm

TTA Depth Gauge

AO Screwdriver Handle

TTA Rapid Screwdriver Shaft for 2.4 Hex Screw and Holding Sleeve

Kirschner Wire, 1 & 2.5mm, one of each

Drill Sleeve/Guide 1.8/2.0mm for 1.8mm drill

TTA Rapid Holding Forceps Angled

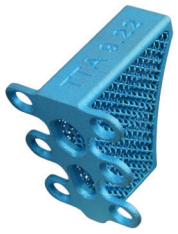
(Patent Pending).

TTA RAPID PREMIUM INSTRUMENT AND IMPLANT KIT	
TTARPREMALL	TTA Rapid Premium Instrument and Implant Kit
TTARPREMIMP	TTA Rapid Premium Implant Kit
TTARPREMINST	TTA Rapid Premium Instrument Kit

TTA RAPID ACCESSORIES

TTA RAPID ACCESSORIES	
TTAR144101010	TTA Rapid K Wire Single Trochar Tip 1.0mm x 100mm
TTAR144102510	TTA Rapid K Wire Single Trochar Tip 2.5mm x 100mm
TTAR148008018	TTA Rapid 1.8mm Drill Bit Round Shaft
TTAR148008020	TTA Rapid 2.0mm Drill Bit Round Shaft
TTAR148008030	TTA Rapid 3.0mm Drill Bit Round Shaft
TTAR148008118	Twist Drill 1.8mm AO 140/30mm AO Shaft
TTAR148008120	Twist Drill 2.0mm AO AO Shaft
TTAR148012030	Twist Drill 3.0mm AO 110/85 AO Shaft

TTA RAPID CAGES



TTA RAPID CAGES TITANIUM	
TTAR310	TTA Rapid Cage 3/10 Titanium
TTAR313	TTA Rapid Cage 3/13 Titanium
TTAR316	TTA Rapid Cage 3/16 Titanium
TTAR4512	TTA Rapid Cage 4.5/12 Titanium
TTAR4515	TTA Rapid Cage 4.5/15 Titanium
TTAR4518	TTA Rapid Cage 4.5/18 Titanium
TTAR616	TTA Rapid Cage 6/16 Titanium
TTAR619	TTA Rapid Cage 6/19 Titanium
TTAR622	TTA Rapid Cage 6/22 Titanium
TTAR7516	TTA Rapid Cage 7.5/16 Titanium
TTAR7519	TTA Rapid Cage 7.5/19 Titanium
TTAR7522	TTA Rapid Cage 7.5/22 Titanium
TTAR919	TTA Rapid Cage 9/19 Titanium
TTAR922	TTA Rapid Cage 9/22 Titanium
TTAR925	TTA Rapid Cage 9/25 Titanium
TTAR10519	TTA Rapid Cage 10.5/19 Titanium
TTAR10522	TTA Rapid Cage 10.5/22 Titanium
TTAR10525	TTA Rapid Cage 10.5/25 Titanium
TTAR1222	TTA Rapid Cage 12/22 Titanium
TTAR1225	TTA Rapid Cage 12/25 Titanium
TTAR1228	TTA Rapid Cage 12/28 Titanium
TTAR13522	TTA Rapid Cage 13.5/22 Titanium
TTAR13525	TTA Rapid Cage 13.5/25 Titanium
TTAR13528	TTA Rapid Cage 13.5/28 Titanium
TTAR1522	TTA Rapid Cage 15/22 Titanium
TTAR1525	TTA Rapid Cage 15/25 Titanium
TTAR1528	TTA Rapid Cage 15/28 Titanium

TTA RAPID TITANIUM SCREWS - 2.0mm HEX HEAD

Please note that the screws use a unique 2.0mm hex screwdriver. **TTAR20342420.**

TTA RAPID SCREWS 2.4MM TITANIUM	
TTARSC2406	TTA Rapid 2.4mm Screw Titanium 6mm
TTARSC2408	TTA Rapid 2.4mm Screw Titanium 8mm
TTARSC2410	TTA Rapid 2.4mm Screw Titanium 10mm
TTARSC2412	TTA Rapid 2.4mm Screw Titanium 12mm
TTARSC2414	TTA Rapid 2.4mm Screw Titanium 14mm
TTARSC2416	TTA Rapid 2.4mm Screw Titanium 16mm
TTARSC2418	TTA Rapid 2.4mm Screw Titanium 18mm
TTARSC2420	TTA Rapid 2.4mm Screw Titanium 20mm
TTARSC2422	TTA Rapid 2.4mm Screw Titanium 22mm
TTARSC2424	TTA Rapid 2.4mm Screw Titanium 24mm
TTARSC2426	TTA Rapid 2.4mm Screw Titanium 26mm
TTARSC2428	TTA Rapid 2.4mm Screw Titanium 28mm
TTARSC2430	TTA Rapid 2.4mm Screw Titanium 30mm
TTARSC2432	TTA Rapid 2.4mm Screw Titanium 32mm
TTARSC2434	TTA Rapid 2.4mm Screw Titanium 34mm
TTARSC2436	TTA Rapid 2.4mm Screw Titanium 36mm
TTARSC2438	TTA Rapid 2.4mm Screw Titanium 38mm
TTARSC2440	TTA Rapid 2.4mm Screw Titanium 40mm