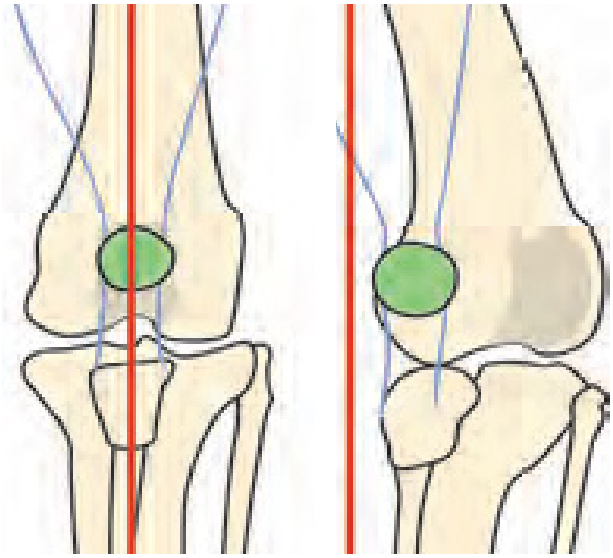
Vi Academy Step by Step

Patellar Luxation - A Step By Step Guide



Patellar luxation is the condition where the patella luxates out of the femoral trochlear sulcus instead of tracking up and down within it. Most commonly the patella luxates medially but lateral luxation also occurs. It can occur in any size or breed of dog but is more common in small breed dogs.
Cats have a broad and flat patella and the femoral trochlear sulcus is shallow; therefore the normal cat patella is much more mobile medial to lateral and relatively unstable compared to dogs.
Patellar subluxation is common in cats but, clinically significant patellar luxation is uncommon.

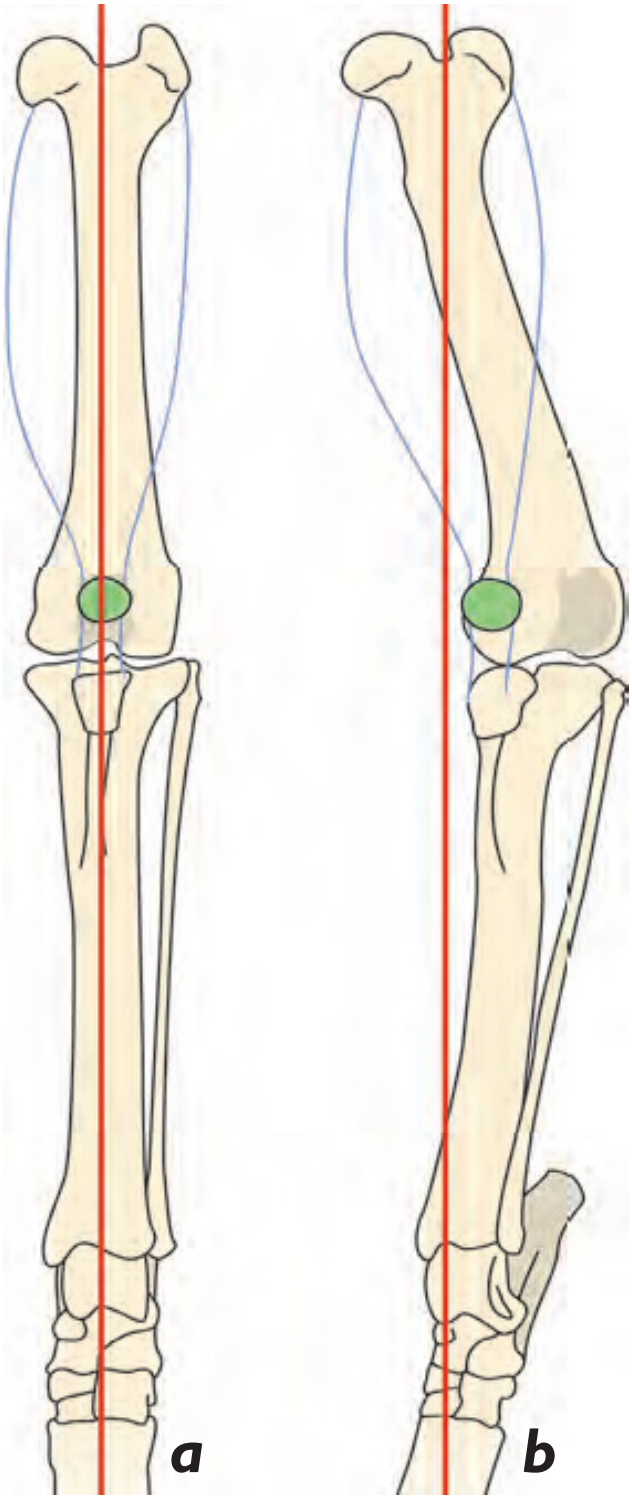
Patellar luxation is usually a diagnosis made from the patient history and signalment, and by stifle manipulation and palpation, rather than from radiographs. This is because the luxating patella is mobile and can change position which can be easily palpated but not necessarily appreciated on a radiograph.
Patellar luxation is graded depending on its severity and there are many ways of doing this. The most commonly used grading system is the Putnam/ Singleton system which can be described as:
Grade 1: The patella tracks normally but luxates with digital pressure or manipulation of the tibia. Once manipulation is discontinued, the patella tracks normally in the trochlear groove. This causes minimal clinical problem with infrequent or no clinical signs. Surgical correction is usually not indicated nor of direct benefit to the patient.
Grade 2: The patella intermittently and spontaneously luxates and resolves. This may be mild and infrequent to severe and frequent, and anywhere in-between. Luxation normally happens as the stifle is flexed, and resolves when the stifle is extended. The typical history is of a dog with intermittent skipping hindlimb lameness. Surgical correction is usually of benefit to the patient, particularly the more frequently patellar luxation occurs.

Grade 3: The patella is always luxated but can be returned to the normal position in the trochlear sulcus by digital manipulation. Once such manipulation stops, patellar luxation recurs. This causes an abnormality of stifle function i.e. inability to extend the stifle and associated hindlimb lameness. Surgical correction is beneficial to the patient as it restores normal stifle function including the quadriceps ability to extend the stifle.
Grade 4: The patella is permanently luxated and cannot be reduced to a normal position despite manipulation. This causes permanently abnormal stifle function with lameness and inability to extend the stifle and can result in debilitating lameness with a crouched pelvic limb stance and gait. Surgical correction is of benefit. In puppies and young dogs with severe grade 4 developmental patellar luxation, surgery should be considered as soon as possible to prevent the progression of skeletal deformities that may otherwise develop. Surgical correction of grade 4 patellar luxation is challenging.

NB Throughout this text for the purpose of clarity, patellar luxation and its treatment will refer to medial patellar luxation. For cases of lateral patellar luxation, the terminology and text is interchangeable but references to position should be switched i.e. medial to lateral and vice versa.

Causes Of Patellar Luxation

Usually a combination of different factors cause patellar luxation. For successful correction, the surgeon must make an individual assessment of each patient, identify each factor present and correct each individually. The common problems are illustrated below:



a. *conformation of pelvic limb of normal dog.*
b. *conformation of pelvic limb of dog with medial bowing (varus) of the femur, internal rotation of the tibia and medial tibial tuberosity malpositioning i.e. malalignment of the quadriceps mechanism relative to the femoral trochlear sulcus, and medial patellar luxation. Red line indicates central axis of the limb.*

1. Malalignment Of The Quadriceps Mechanism And Trochlear Sulcus

The stifle extensor mechanism comprises the quadriceps muscle with the origin of the three vastus muscles on the proximal femur and rectus femoris on the pelvis just cranial to the acetabulum, the patella, patellar tendon/ligament and tibial tuberosity. The relative position of these, in particular the patella and the trochlear sulcus is important. For normal patellar tracking, the line-of-pull of the quadriceps mechanism and the patella should lie directly over the femoral trochlear sulcus.

Factors that affect quadriceps alignment are:

- Bowing of the distal femur. This changes the position and alignment of the femoral trochlear sulcus relative to the quadriceps mechanism. Femoral bowing can be assessed from physical assessment, radiographs and CT images, but interpretation can be challenging and the normal range is not been well defined.
- Tibial malformation i.e. a rotational (torsional) deformity of the tibial tuberosity can cause malalignment of the quadriceps mechanism due to abnormal positioning of the tibial tuberosity relative to the femoral trochlear sulcus.
- Bowing of the proximal tibia; often the proximal tibia is bowed in the opposite direction to the distal femur.
- Hip conformation and pathology; for example cranio-dorsal hip luxation causes functional foreshortening of the femur with external rotation; this in turn causes quadriceps/ femoral trochlear sulcus malalignment and patellar luxation can occur.

2. Shallow Femoral Trochlear Sulcus

Too shallow a sulcus or insufficiently high medial or lateral trochlear ridges can result in inadequate constraint of the patella and subsequent luxation. Assessment of sulcus depth and trochlear ridge height is subjective; there is no guide that differentiates normal from abnormal.

3. Excessively Tight Medial Soft Tissues

i.e. retinaculum and joint capsule. If the soft tissues medial to the patella are too tight, they will constrain its movement by permanently 'pulling' it medially. It is likely that these tissues become tight as a consequence of chronic patellar luxation, rather than causing it.

4. Slack Lateral Soft Tissues

i.e. retinaculum, joint capsule and femero-patellar ligament; if these tissues are loose, then the patella is not 'pulled' or constrained laterally i.e. patellar luxation can occur. These tissues are loose in the opposite direction to the patellar luxation, and most likely develop as a result of patellar luxation rather than causing it.

5. Co-Existing Rupture Of The Cranial Cruciate Ligament

Patellar luxation may occur in association with cranial cruciate ligament rupture. When the cranial cruciate ligament ruptures, cranial and internal rotational stability of the tibia relative to the femur is lost; this causes malpositioning of the tibial tuberosity relative to the femoral sulcus, and quadriceps malalignment.

Surgical Solutions

The four commonly performed surgical options available to correct patellar luxation include:

1. **Femoral Trochlear sulcoplasty** i.e. deepen the trochlear sulcus to constrain the patella and prevent luxation. This is done if the trochlear sulcus is assessed to be too shallow.

2. **Tibial Tuberosity Transposition** i.e. realign the quadriceps mechanism by osteotomy and re-pos itioning the tibial tuberosity more laterally. This is done if malalignment of the quadriceps mechanism and the femoral trochlear sulcus are present.

3. **Medial Release** i.e. transect the medial soft tissues (joint capsule and/ or retinaculum) if they are excessively tight. This is done if medial soft tissue tension prevents the patella from tracking in the trochlear sulcus, usually only necessary in grade 3 or 4 luxations

4. **Lateral Imbrication** i.e. tighten the lateral soft tissues (joint capsule and retinaculum) to prevent patellar luxation. This is done if the soft tissues are too loose, but it should not be relied on to correct patellar luxation because future tissue loosening will likely develop if quadriceps alignment or inadequate sulcus depth persist.

Other surgical produces may be used to correct patellar luxation, but these are more demanding procedures. TPLO or lateral fabella suture may be used with concurrent cranial cruciate ligament disease. Corrective osteotomies of the distal femur and/ or proximal tibia may be performed if there is significant femoral/ tibia malalignment, but the inclusion criteria are poorly defined. Partial parasagittal patellectomy may be performed in cats if patellar luxation cannot be constrained using traditional means. If significant hip pathology is present such as hip subluxation, this may need to be addressed to successfully correct patellar tracking. However, these are demanding surgeries, and best undertaken by experienced surgeons.

Surgical Technique For (Medial) Patellar Luxation

Initial Approach And Assessment

1

Pre-operative assessment includes a full clinical examination of the patient including gait assessment and orthopaedic examination. Patellar stability and pelvic limb alignment should be assessed.

2

Take orthogonal radiographs of the stifle. Consider including a full caudo-cranial view of the entire hindlimb from hip to tarsus to assess bowing deformities of the tibia and femur (Fig 1).
The radiographs allow other differential diagnoses to be excluded, possibly the diagnosis to be confirmed, and preoperative measurements made to plan the correct position of the osteotomy for tibial tuberosity transposition (Fig 2).

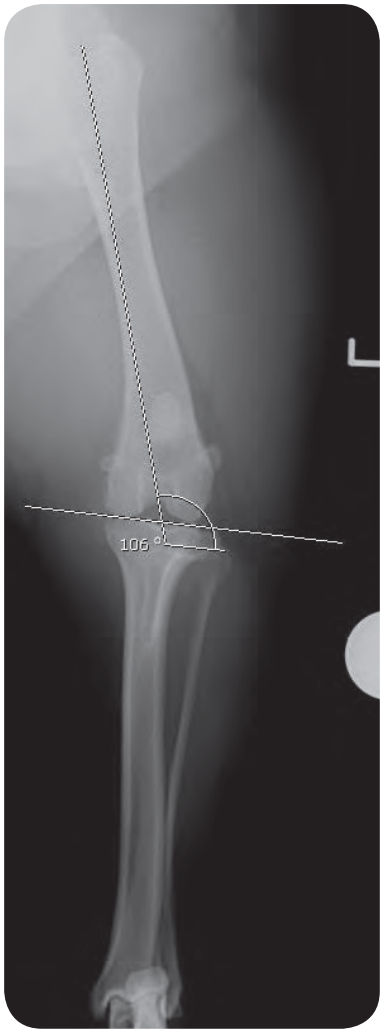


Fig 1

Fig 2

3

Position the patient in dorsal recumbency (Fig 3) and prepare a full aseptic surgical preparation of the limb with the entire distal limb draped in (Fig 4) and the foot in a sterile impervious dressing. This allows full access and manipulation of the limb during surgery.

Fig 3

Fig 4

4 Before starting the surgery, check patella position and anatomic landmarks that will guide the surgery i.e. patella, patellar ligament and tibial tuberosity (Fig 5). Visualise the patellar ligament/ tendon and assess whether it is laterally, neutrally or medially positioned from patella to tibial tuberosity. Do this with the tibia internally rotated, in neutral, and externally rotated. This will give an indication of whether a tibial tuberosity transposition is necessary, and if so by how much.

Fig 5

5 Make a lateral para-patellar skin incision over the stifle about 1cm lateral to the patella, extending from proximal to the patella to the tibial tuberosity (Fig 6).

Fig 6

6 Dissect the subcutaneous fascia until the patellar ligament and tibial tuberosity are clearly seen (Fig 7).

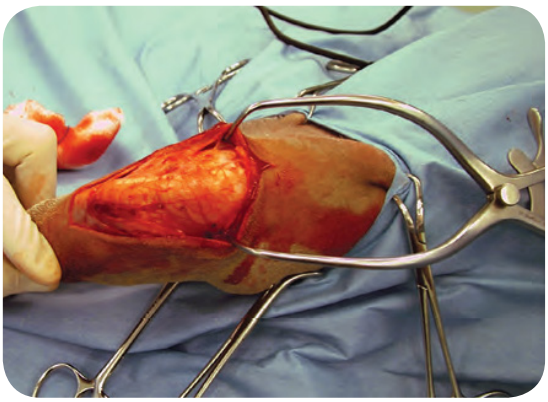


Fig 7

7 Repeat assessment of the alignment of the quadriceps mechanism. Stand at the toe of the dog and visualise the course and position of the quadriceps mechanism. Review this whilst flexing the stifle and internally rotating the tibia. Note whether the quadriceps mechanism is aligned or malaligned i.e. does the patellar ligament deviate medially, laterally or is it neutral? (Fig 3 & 4).

8 Sharply incise the lateral retinaculum approx. 1cm lateral to the patella. Dissect free from the underlying joint capsule. This incision extends proximal to the patella. The joint capsule is exposed underneath (Fig 8).

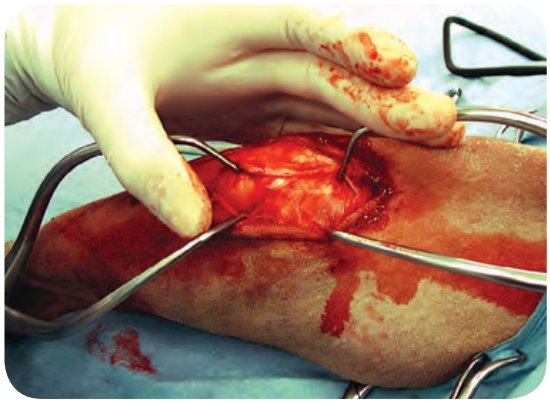


Fig 8

9 Sharply incise the joint capsule. This incision extends proximal to the patella, extending slightly into distal vastus lateralis. Use suction to aspirate synovial fluid. Luxate the patella medially, flex the stifle and use Gelpi retractors to maintain position (Fig 9).

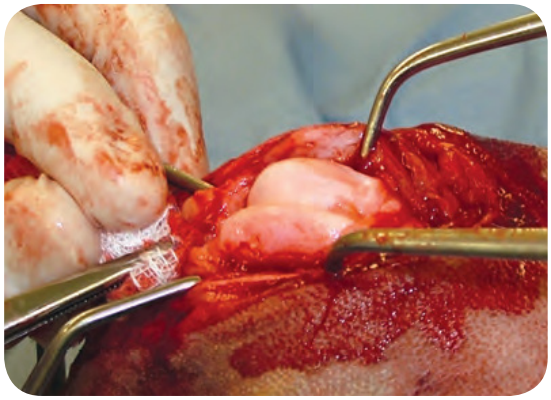


Fig 9

10 Inspect and confirm that the cranial cruciate ligament is normal.

11 Assess the depth of the trochlear groove (subjective), and inspect for cartilage erosions of the femoral trochlear sulcus. Fig 10 shows full thickness cartilage erosion (circled green) of the proximal medial trochlear ridge where the patella has been luxating, a relatively shallow trochlea and a medial trochlear ridge with poor height.

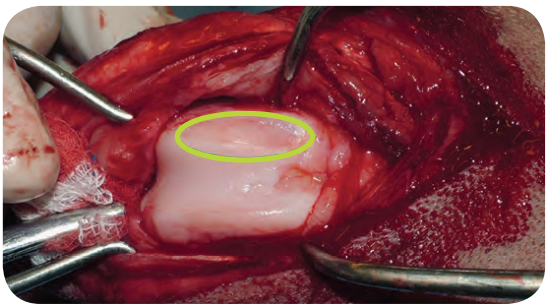


Fig 10

12 Remove the Gelpi retractors, retroflex the patella and assess the articular cartilage damage on the caudal aspect of the patella. Fig 11 shows a large full thickness articular cartilage defect on the caudal aspect of this patella; this may adversely affect prognosis.

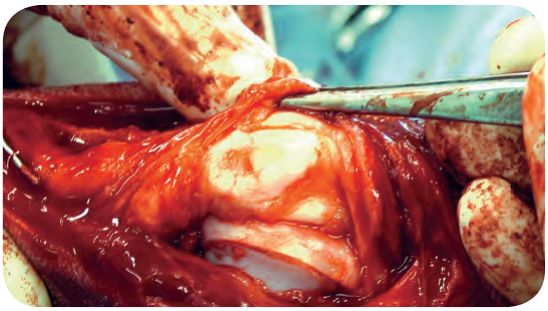
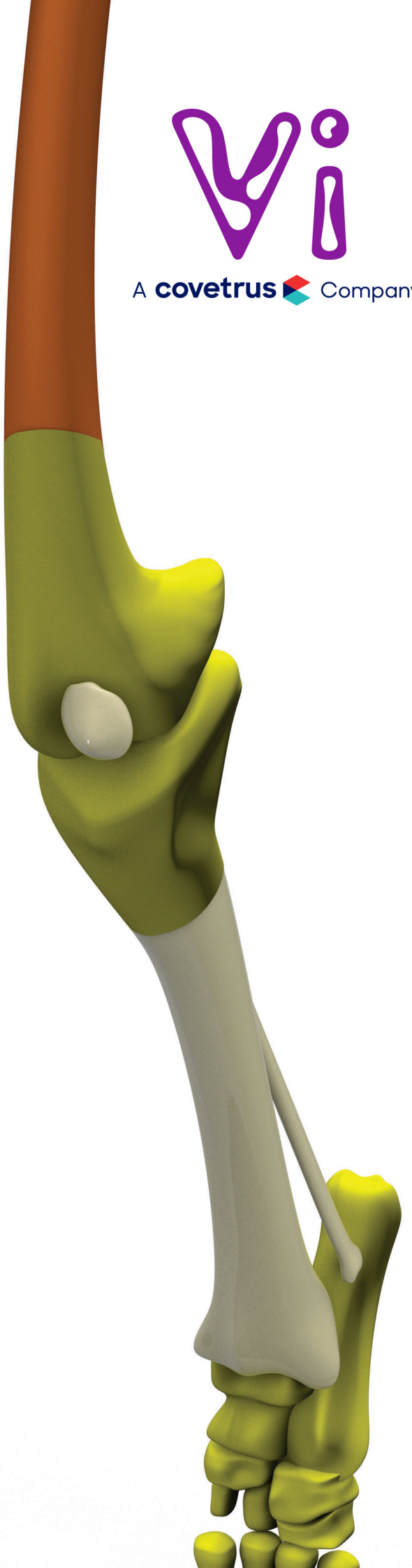


Fig 11

Medial Release

Medial release is not necessary for most cases but is necessary when the tension in the medial tissues is such that the patella cannot be returned to the trochlear sulcus without performing release, or if the tension is adversely influencing patellar tracking i.e. grade 4 or severe grade 3 patellar luxation. If medial release is to be performed, it is best performed as the first step i.e. before femoral trochlear sulcoplasty, and certainly before tibial tuberosity transposition. To perform medial release, a medial approach is made to the stifle in a similar way as described above for the lateral approach. The incision extends far enough proximally until all excessive soft tissue tension has been abolished. In most dogs, this means releasing both the medial retinaculum and the joint capsule in the region of and just proximal to the stifle. If severe, the release may need to extend up to the proximal femur and pelvis.



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Femoral Trochlear Sulcoplasty

Assess the depth of the femoral trochlear sulcus and the need for sulcoplasty; this is a subjective judgement (Fig 10). If the trochlear sulcus is deep enough, sulcoplasty is not necessary. When assessing whether to perform sulcoplasty or not, consider that the detrimental effect of sulcoplasty is unavoidable cartilage damage and this needs to be carefully balanced against the benefits. Methods for sulcoplasty include:

1. **Block Recession Sulcoplasty**
   In adult dogs, this is the best option as it preserves the largest amount of articular cartilage, it enables a larger amount of the sulcus to be deepened, and it creates a deeper femoral trochlea proximally compared to wedge recession sulcoplasty. However, it is also the most fiddly and technically demanding method and requires precise surgical technique and a modular osteotome (Fig 12) with thin, sharp blades of different widths. It is challenging to do this well single-handed; a surgical assistant is necessary.

Fig 12

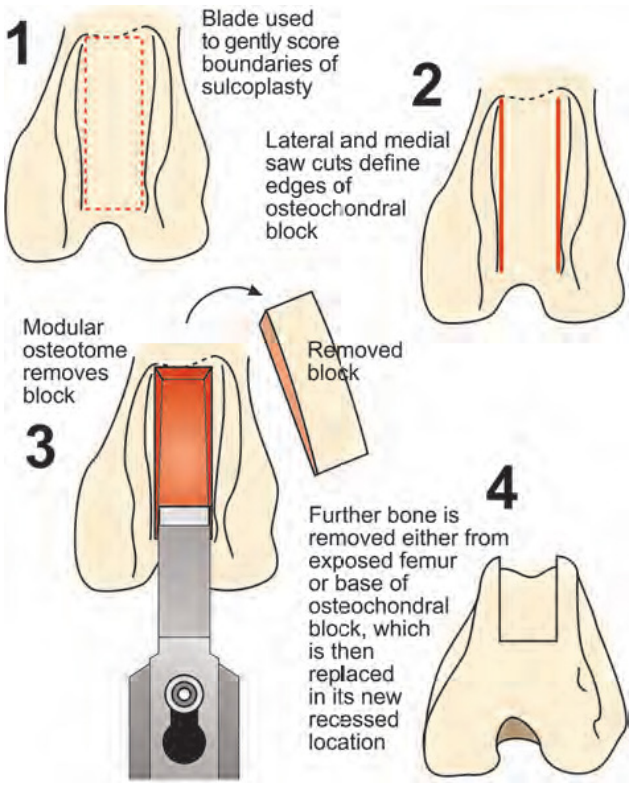
2. **Wedge Recession Sulcoplasty**
   This is the next best option as it preserves some articular cartilage, but it does not deepen the trochlear sulcus as well as block recession sulcoplasty. It is simpler to perform, can be done with less specialised equipment or experience, and the risk of graft fracture is less.

3. **Abrasion Sulcoplasty (Rasping)**
   A bone rasp (Fig 13) is used to rasp the trochlear sulcus until adequate depth is achieved. This is the least favourable option as all articular cartilage is destroyed. This technique is not recommended unless no articular cartilage is present, which is unlikely except in revision surgery. Inexperienced surgeons may choose to start using this technique, particularly in very small stifles where the osteotomy techniques above may be challenging and carry a risk of fracture of the osteochondral graft or the femur if the cuts are made too deep.

Fig 13

4. **Chondroplasty**
   This is rarely performed as it can only be done in very young patients less than 6 months of age as the cartilage is not flexible enough in older patients. The articular cartilage of the trochlear sulcus is sharply dissected away from the subchondral bone and remains attached distally. The underlying bone is deepened, then the articular cartilage is laid back in the trochlear groove.

Block Recession Sulcoplasty



1 Determine the width of the intended sulcoplasty by choosing the modular osteotome blade that best fits the maximum width of the trochlea. Using a #11 blade, gently score the intended cut position on medial and lateral trochlear ridges.

2 Using a fine X-ACTO saw or similar, make the lateral and medial cuts that will define the edges of the osteochondral block. (Fig 14) Make sure the base of the cuts are flat and not domed. Be careful to make the osteotomy as wide as possible, yet leave enough lateral and trochlear ridge width that neither is weakened.

Fig 14

3 Use the modular osteotome and mallet to cut the base of the block from distal to proximal. (Fig 15) Start just cranial to the intercondylar notch and aim for the osteochondral junction of the trochlear groove proximally. This must be done very carefully and with great care to avoid fracturing the block. A thick osteotome will increase the chance of fracture. If the block fractures, it can be salvaged.

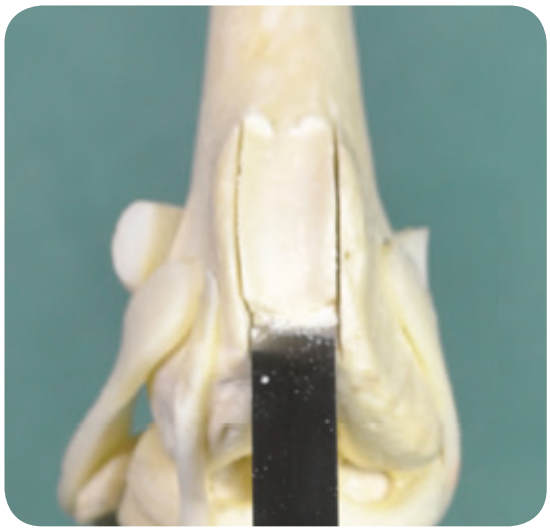


Fig 15

4 Carefully remove the osteochondral block from the femoral trochlea (Fig 16).

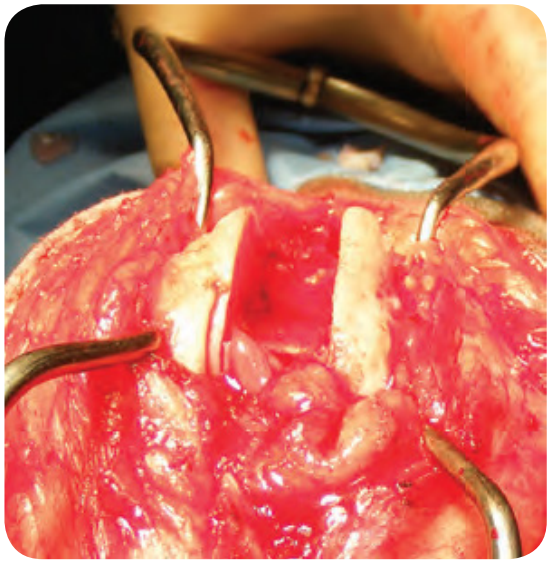


Fig 16

5 Recess the block by taking further subchondral bone away, either from the exposed femoral subchondral bone or from the base of the osteochondral block.

6 Re-position the osteochondral block in the graft site and review for closeness of fit, stability, and depth of recession achieved (Fig 17). Adjust until satisfactory and stable.

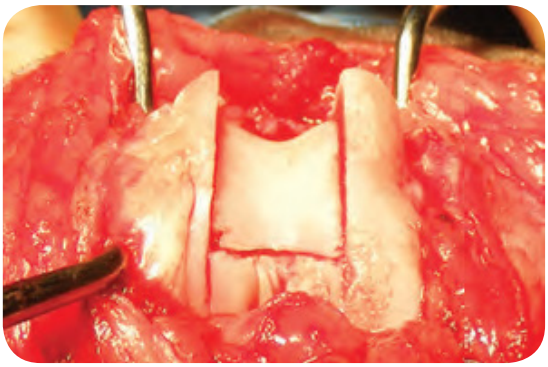


Fig 17

7 Remove the Gelpi retractors, return the patella to the trochlear sulcus and assess the patella for normal tracking and medial-lateral stability.

Wedge Recession Sulcoplasty

1 Using a #11 blade, score the highest points of the medial and lateral trochlear ridges of the femur; this marks the cutting points. Using an fine X-ACTO saw, create an osteochondral wedge from the trochlear sulcus. The lateral and medial saw cuts should be oriented to meet just cranial to the intercondylar notch of the femur distally and proximally at the osteochondral junction (Fig 18).

Fig 18

2 Carefully remove the cut wedge from the femoral trochlea (Fig 19).

Fig 19

3 Recess the wedge by removing a further thin section of subchondral bone; either from the exposed femoral trochlear sulcus (Fig 20) which is best, or from the wedge itself but the latter is much more difficult and will make the wedge narrower and lose more articular cartilage.

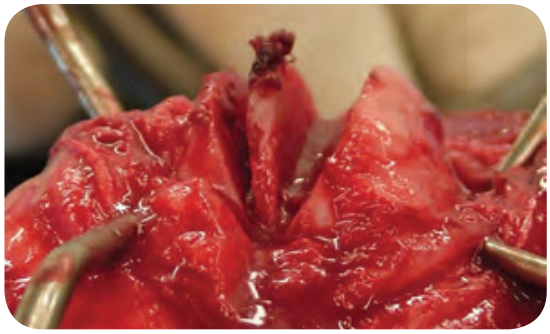


Fig 20

4

Replace the osteochondral wedge in the recessed femoral sulcus and review for closeness of fit, stability, and depth of trochlear recession achieved. Adjust until satisfactory (Fig 21). Some surgeons prefer to remove subchondral bone from the base (apex) of the wedge with rongeurs; this can give a better fit and stop the graft from rocking on the ridge of the base.

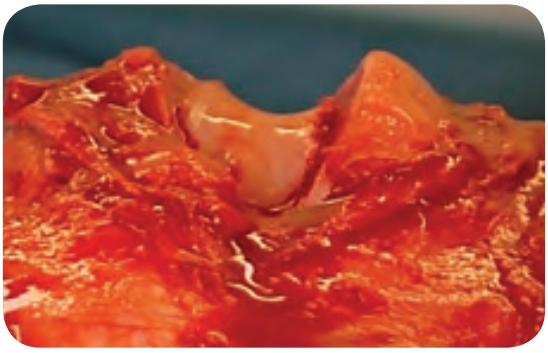


Fig 21

5

Remove the Gelpi retractors, return the patella to the trochlear sulcus and assess the patella for stability through a full range of physiological stifle movement, specifically flexing from full extension with tibial internal rotation - these are the positions most likely to cause luxation. Patellar luxation should be resolved prior to soft tissue closure - do not rely on soft tissue closure to ensure patellar stability.

Tibial Tuberosity Transposition

Assess the need for tibial tuberosity transposition prior to surgery, an indication should have been derived from physical examination and radiographs or CT scan. The dog should be in dorsal recumbency. Stand at the foot of the dog, looking up the pelvic limb (Fig 3 & 4). Hold the stifle in full extension. Observe the orientation and position of the patellar ligament, patella and tibial tuberosity whilst the stifle is extended and flexed and the tibia is rotated internally and externally; the most likely position for patellar luxation is flexing with internal tibial rotation. If patellar ligament orientation is not neutral and patellar luxation occurs, tibial tuberosity transposition is indicated.

As an example, (Fig 22) shows the relative positions of the patella (reduced and luxated), the position of the tibial tuberosity and the medial orientation of the patella, patellar ligament and tibial tuberosity.

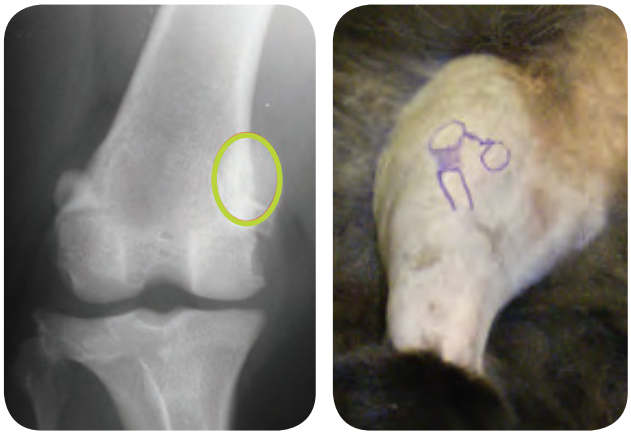
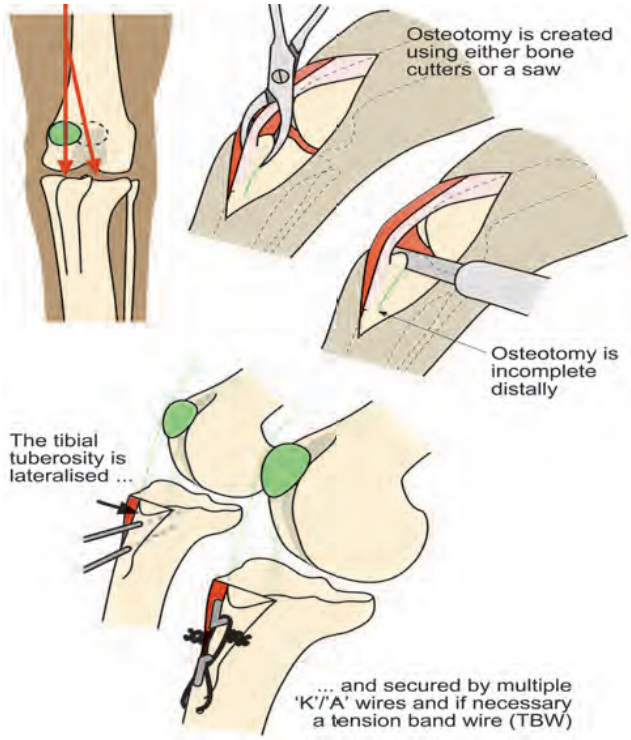


Fig 22

Tibial Tuberosity Transposition Surgery



1 Use sharp dissection (#11 blade and periosteal elevator) to expose the medial aspect of the tibial tuberosity.

2 If using a finger saw or hacksaw (not if using an oscillating saw), sharply dissect and elevate the cranial tibial muscle from the lateral tibial tuberosity. Ensure that the most proximal attachments of the muscle are not severed i.e. the muscle should only be partially elevated to minimise damage from the saw blade, but not fully elevated.

3 Perform an osteotomy of the tibial tuberosity (Fig 23). An oscillating saw gives the most controlled and precise cut but alternatively use a hand saw, bone cutters or osteotome). Place a Freer elevator or Gelpi retractor under the patellar ligament to protect it from the saw.

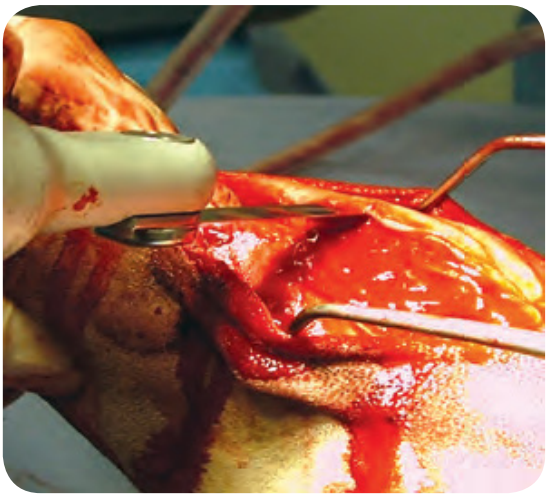


Fig 23

4 The size of tibial tuberosity and position of osteotomy is important to minimise the chance of fracture. As a guide, the cranio-caudal depth of the osteotomised tibial tuberosity should be about 30% the cranio-caudal dimensions of the tibia at that point. The osteotomy should go between the proximal tibia and the base of the tibial tuberosity, keeping a bridge of intact cortical bone and periosteum distally. Fig 24 shows pre-operative plan for size and position of the tuberosity osteotomy; a sterile ruler can be used during surgery to replicate the measurements and ensure the osteotomy is in the correct position.

Fig 25 shows a postoperative radiograph with a good to large sized tibial tuberosity. If the osteotomy is made in the wrong position, either the tibial tuberosity or the tibia are at risk of fracture.

Fig 24

Fig 25

5 The tibial tuberosity should now be mobile proximally (medial to lateral) but the distal aspect should remain attached. Using a periosteal elevator, gently and minimally elevate the tibial tuberosity from the tibia and transpose it laterally to a position that achieves neutral orientation of the patellar ligament and quadriceps mechanism (Fig 26). If the tuberosity is not readily mobile, this usually means the osteotomy is not quite complete enough and needs slightly more work distally. Some surgeons like to prepare the graft bed prior to tibial tuberosity fixation; to do this, the ridge from the lateral edge of the parent tibial tuberosity site is removed using rongeurs.

Fig 26

6

Using a power drive where available, place a K-wire into the proximal tibial tuberosity just proximal to the distal insertion point of the patellar ligament. This immobilises the tibial tuberosity in its new laterally transposed position (Fig 27, 28 & 29).

Fig 27

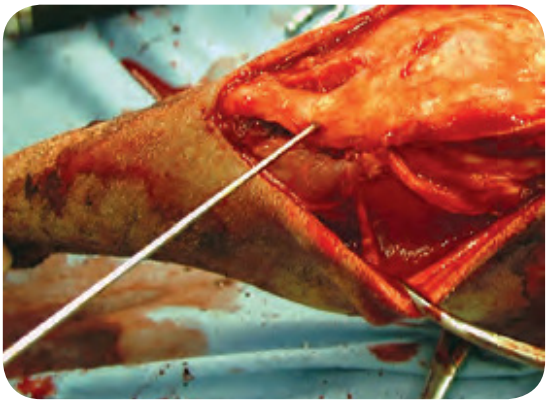


Fig 28

Fig 29

The K-wire should be directed slightly cranio-lateral to caudo-medial. Ideally 2 parallel K-wires are placed adjacent to each other. The size of K-wire should be appropriate to the patient (Fig 30 & 31). A Jacobs chuck can be used to drive the K-wires but this is harder to drive the wire through the bone without slippage and wire bending.

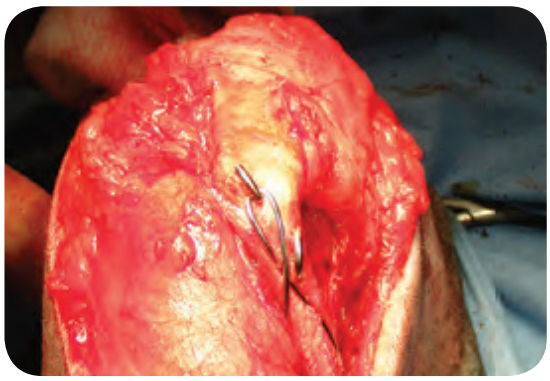


Fig 30

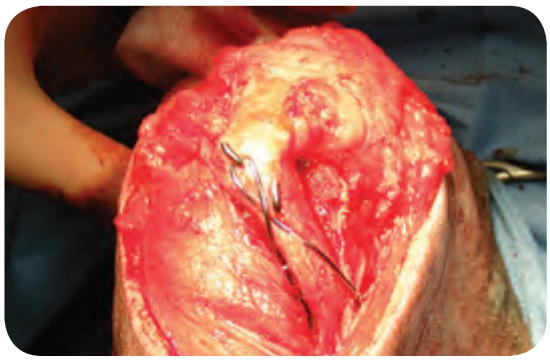


Fig 31

7

Application of a figure-of-8 tension band is highly advisable; care must be taken during placement to not damage the soft tissues, particularly the patellar ligament.

8

Looking from the position of the dog's foot, review the orientation of the patellar ligament and the position of the tibial tuberosity. The patellar tendon/ ligament should be in a neutral position. internal and external rotation of the tibia should cause equal medial and lateral orientation of the patellar ligament with no patellar luxation (Fig 30 & 31) with internal and external rotation respectively; note the changing alignment of the patellar ligament as the tibia is rotated. Fig 32 & 33 show the patella in the correct position.

Fig 32

Fig 33

9

Review the stability of the patella and specifically assess for luxation. Start with the stifle in full extension and slowly flex with the tibia in full internal and then external rotation as these are the positions most likely to cause (medial and lateral) luxation. The patella should now be stable through a full range of normal physiological movement and should not luxate.

NOTE - Patellar luxation should be resolved prior to soft tissue closure - do not rely on soft tissue closure to ensure patellar stability.

Lateral Imbrication

For most cases of patellar luxation, once sulcoplasty and tibial tuberosity transposition have been performed, the patella should be stable, luxation should not be impossible and further surgery (other than routine closure) should not be necessary. If the patella is not stable at this stage, the trochlear sulcoplasty and tibial tuberosity transposition should be critically reviewed, and revised as necessary.

Performing lateral imbrication without adequate trochlear sulcoplasty or tibial tuberosity transposition is not recommended as it is associated with a high risk of patellar re-luxation.

Lateral imbrication tightens the soft tissues on the lateral aspect of the stifle joint; the joint capsule and retinaculum can be closed separately. Imbrication can be achieved by one of two methods:

- Using Mayo scissors, resect a strip from one edge of the retinaculum and/ or joint capsule. Don't take so much tissue that it cannot then be sutured together. The tissue should close snugly but without tension. Close the joint capsule and retinaculum separately with simple interrupted appositional sutures.
- Or place modified Mayo Mattress (vest over pants) sutures to close the retinaculum and/ or joint capsule in an overlying instead of an appositional fashion.

Closure

Before considering the surgery complete, once again check patellar stability through a normal physiological range of stifle movement, particularly flexing the stifle from full extension with tibial internal and external rotation. If patellar luxation persists, the surgery needs to be reviewed and revised. The surgical site should be flushed thoroughly and then closed:

- Appose and close the joint capsule incision; unless release was performed, then not on that side.
- Appose and close the retinacular incision unless release was performed, then not on that side.
- Appose and close the subcutaneous fascia.
- Appose and close the skin.

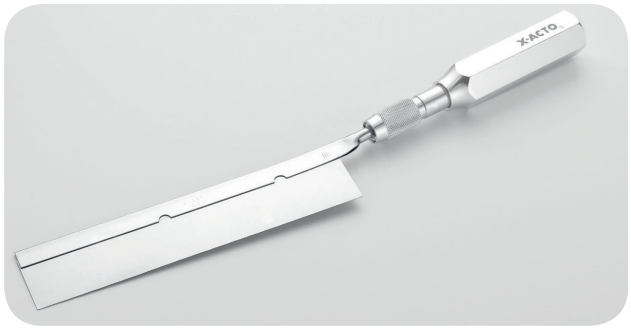
Post-operative radiographs of the stifle are taken to confirm the patella has been returned to the trochlear sulcus, that the positions of the sulcoplasty and tibial tuberosity transposition are correct and appropriate, and that implants are in the correct position (Fig 34 & 35). Radiographs should be critically assessed for potential problems before the patient is recovered from the anaesthetic.

Fig 34

Fig 35

Patellar Luxation Instrumentation

X-Acto Saw



XACTOB/H X-Acto Saw Complete 270mm
XACTOHANDLE X-Acto Saw Handle only 140mm
XACTOBLADE X-Acto Saw Blade 0.3mm cut 140mm
XACTOSTERILE-A X-Acto Saw Blade Sterile 0.3mm cut 140mm

Hard Backed Orthopaedic Saw

001004 Orthopaedic Hard Back Saw 0.4mm cut Stainless Steel 145mm

Adjustable Bone Saw

001000 Adjustable Bone Saw c/w 5 Fine Blades
001001 Spare Fine Blades Pack of 5 Chrome Plated
001000SS Adjustable Bone Saw Blade (Single) Sterile

Gordon Coronoid Osteotome

AR-17-30 Gordon Coronoid Osteotome (4mm)
AR-17-29 Gordon Coronoid Osteotome (2mm)

Modular Osteotome with Ultra-thin Interchangeable Blades and Diamond Rasp

001380 Modular Osteotome complete with 7 Blades
001382 Modular Osteotome Replacement Blade 4mm
001390 Modular Osteotome Replacement Blade 5mm
001383 Modular Osteotome Replacement Blade 6mm
001384 Modular Osteotome Replacement Blade 8mm
001385 Modular Osteotome Replacement Blade 10mm
001386 Modular Osteotome Replacement Blade 12mm
001387 Modular Osteotome Replacement Blade 15mm
001388 Modular Osteotome Replacement Blade 20mm
001389 Modular Diamond Rasp 6mm
001380SCREW Spare Screw for Modular Osteotome

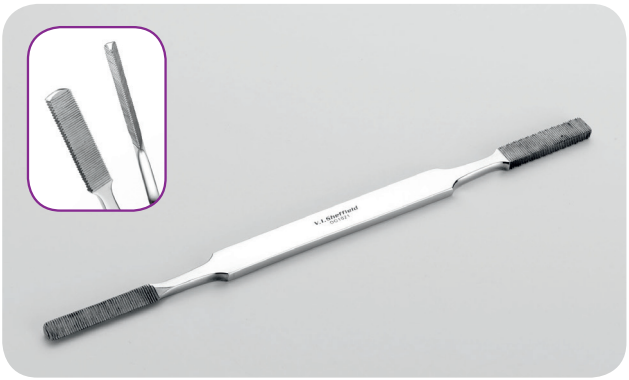
Orthopaedic Mallet

001320 Mallet 300g 220mm Long

Rectangular Sulcoplasty Instruments

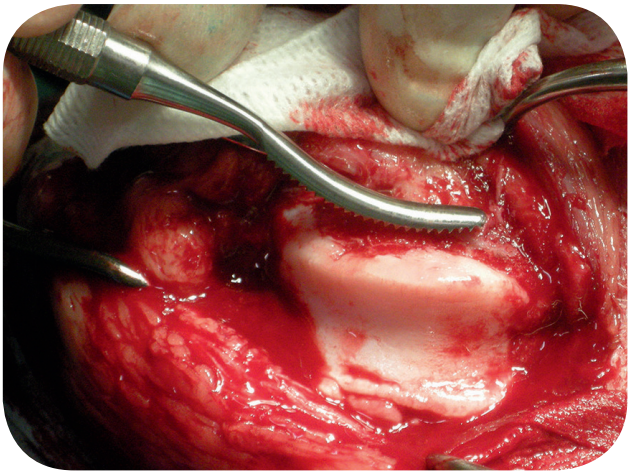
001017 Super Slim Osteotome 8mm 180mm
001018 Rectangular Bone Rasp 210mm

Universal Sulcoplasty Rasp



001021 Universal Sulcoplasty Rasp 210mm Long

Osteophyte Rasp



001019 Osteophyte Rasp

Trochlea Rasp

001020 Trochlea Rasp 11mm max 5mm min Diameter
001022 Trochlea Rasp Small 8mm max 3mm min Diameter

MiniDriver Sets

VIMDB2 MiniDriver Basic Set (inc MkII Saw)

Vi Black Series Battery Powered Drill/ Saw Set

BLACKKIT Vi Black Series Drill/ Saw Set

Variable Speed Orthopaedic Drill

001600 Variable Speed Orthopaedic Drill (Milwaukee) Kit - Drill, Chuck, Key, Shroud, Extension & 2 x Batteries

Multi Saw Battery Powered

001708.134 Multi Saw Surgical Kit incl Convertor, Shroud, Titanium Nitride Coated Blade and SB5071-134 Blade

Rongeurs

001300	Small Curved Rongeur 4mm Bite 170mm Long
142502	Micro-Friedman Rongeur Curved 2.2mm Bite 155mm Long

Simple Action Cutters

001310	Small Angled Cutter 15mm Blade 170mm Long
001311	Large Angled Cutters 19mm Jaw 230mm Long

Orthopaedic Wire

OW0210	0.2 (diameter in mm)
OW0310	0.3
OW0410	0.4
OW0510	0.5
OW0610	0.6
OW0710	0.71
OW0810	0.8
OW0910	0.9
OW1010	1.0
OW1012	1.2
OW1015	1.5

Wire Twister/ Shear Cutter

001260	Wire Twister/ Shear Cutter 165mm Long
001261	Wire Twister/ Shear Cutter - Tungsten Carbide Jaws 165mm Long

Kirschner Wire

090030	0.9mm diameter 125mm Long Pack of 10
090070	1.0mm diameter 125mm Long Pack of 10
090031	1.1mm diameter 125mm Long Pack of 10
090071	1.25mm diameter 125mm Long Pack of 10
090034	1.4mm diameter 125mm Long Pack of 10
090072	1.5mm diameter 125mm Long Pack of 10
090032	1.6mm diameter 125mm Long Pack of 10
090073	1.8mm diameter 125mm Long Pack of 10
090033	2.0mm diameter 125mm Long Pack of 10
090030/3M	Pack of mixed Kirschner Wires

Arthrodesis Wire

090054	0.8mm diameter 125mm Long Pack of 10
090020	0.9mm diameter 125mm Long Pack of 10
090060	1.0mm diameter 125mm Long Pack of 10
090021	1.1mm diameter 125mm Long Pack of 10
090061	1.25mm diameter 125mm Long Pack of 10
090024	1.4mm diameter 125mm Long Pack of 10
090062	1.5mm diameter 125mm Long Pack of 10
090022	1.6mm diameter 125mm Long Pack of 10
090026	1.8mm diameter 125mm Long Pack of 10
090023	2.0mm diameter 125mm Long Pack of 10
090025S	Pack of mixed Arthrodesis Wires

Jacobs Chuck

001220	Small Jacobs Chuck with Handle 5/32" Capacity 260mm
001221	Standard Jacobs Chuck with Handle 1/4" Capacity

Small Pin Vice

001223	Small Pin Vice 100mm Long

Implant Cutters

001237	Implant Cutter Stainless Steel Cuts to 2.2mm Capacity 230mm Long
001238	Implant Cutter Stainless to 1.5mm Capacity Close Cut 150mm Long

'K' Wire Bender

001362	'K' Wire/ Small Pin Bender 140mm Long

'K' Wire/ Small Pin Punch

001360	Pin Punch 135mm Long
001361	Small Pin Punch 1.6mm Tip 135mm Long

To place an order contact our Vi Advisor Team on 0345 130 9596 or email info@vetinst.com

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