Surgery Guide

Fixation of Long Bone (Diaphyseal) Fractures Using Locking Plates and Screws

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Locking plates for veterinary use have existed since the late 20th century and the technology has evolved considerably to the locking systems that are available today in the 2020s. Many different types of locking systems exist, each with various advantages and disadvantages. Non-locking plates may still be appropriate for many applications but do have certain limitations. The surgeon should be aware of the circumstances of application that would exacerbate the limitations of non-locking plates, and it is in these situations that locking plates should be considered.

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What is a Locking Plate and How do They Work?

A locking plate is a plate in which the screw "locks" into the plate. This makes the coupling between the plate and the screw significantly more stable and secure than a non-locking plate (Fig. 1). A locking plate can be thought of a bit like an internal external skeletal fixator, due to its angular rigidity, with the comparative components being:

- Locking plate = ESF connecting bar
- Locking screw head where it locks into the plate hole = ESF clamp
- Screw thread = ESF pin

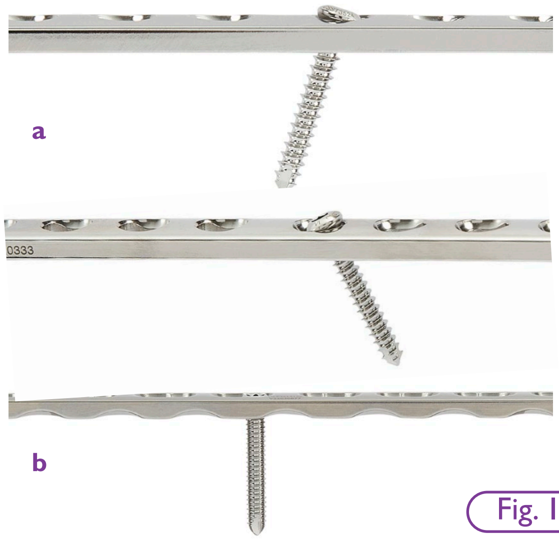


Fig. 1

Fig. 1(a) shows that a non-locking screw is not angle stable and can theoretically toggle in the plate hole. By contrast, a locking screw (b) is locked into the plate at a fixed 90degree angle. It is angle stable; toggling is not possible.

Non-locking plates work by tightening the screw as tight as possible; this compresses the plate down onto the bone. Friction is generated between the plate and the bone, making the bone-plate construct stable (Fig. 2).

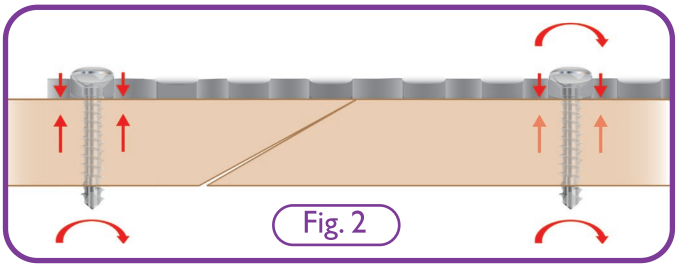


Fig. 2

Fig. 2 illustrates how a non-locking plate works. The curved arrows indicate the tightening of the screw, the opposing straight arrows indicate the friction between the plate and the bone and the subsequent construct stability.

In most situations, non-locking screws and plates work very well, but there are several inherent problems with non-locking plates:

- Non-locking screws must be as tight as possible to generate compression and friction.
- Non-locking screws are therefore prone to stripping, particularly in soft/poor quality bone. A stripped screw is functionally and mechanically useless, as it does not grip the bone.
- A non-locking plate must be accurately contoured to the bone; this is to ensure good plate-bone contact which is essential to generate friction (Fig. 3a).


Fig. 3a

Fig. 3a. A plated bone model demonstrating accurate plate contouring.

- In order to ensure absolute contact between plate and the bone, the periosteum should be stripped from immediately under the plate. Inadequate removal of periosteum and soft tissue will mean that screws cannot be tightened sufficiently (Fig. 3b). However, this causes more biological trauma and may cause localised devascularisation of the bone, secondary to the periosteal stripping and due to pressure necrosis from the plate. This may be detrimental to fracture healing although the clinical importance of this in small animal fracture management is unproven.

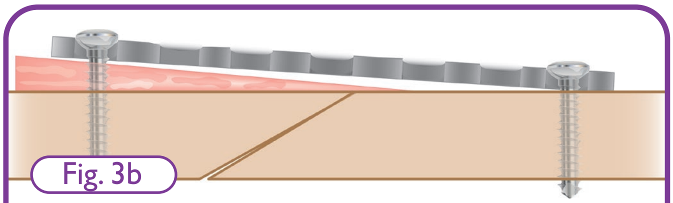


Fig. 3b

Fig 3b. Inadequate removal of soft tissue means the non-locking plate cannot be sufficiently compressed onto the bone.

- The compression of the plate onto the bone, and the necessary removal of periosteum from under the plate, may cause vascular disturbances in the superficial bone, which could lead to bone devascularisation and remodelling.

- As non-locking screws can move the plate relative to the bone (and vice versa), they have the potential to pull the bone out of correct alignment (Fig. 3c).

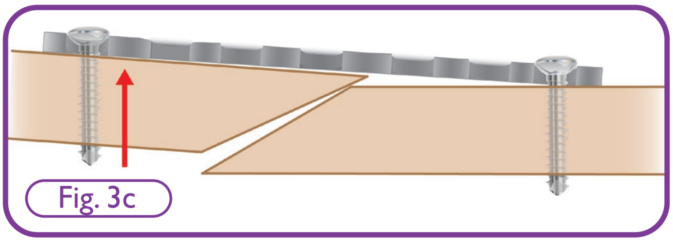


Fig. 3c. Non-locking screws have the potential to pull the bone out of alignment, due to the upward movement of the bone towards the plate as the screw is tightened.

- As non-locking screws can rock or 'toggle' in the screw hole of the plate, they are not angle stable. Non-locking screws should, therefore, be placed as bi-cortical screws and not as mono-cortical screws (Fig. 3d).

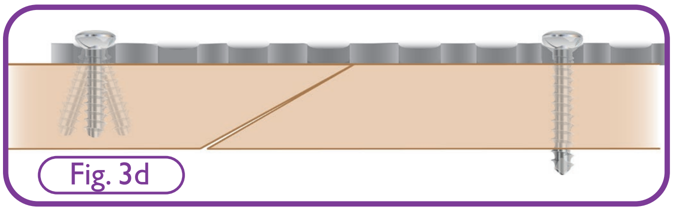


Fig. 3d. 'Toggling' of a uni-cortical non-locking screw that is not angle stable, on the left of the image; bi-cortical application is recommended to avoid this instability, as shown on the right of the image.

- For bi-cortical screws in an unstable construct, toggling can lead to shearing of the bone, predominantly the cis (near) cortex (Fig 3e).

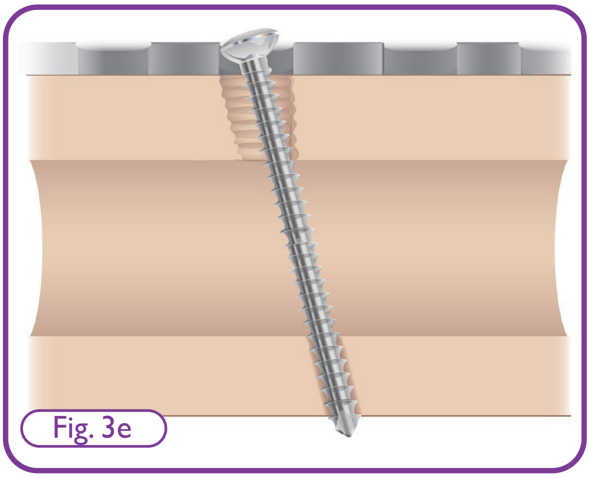
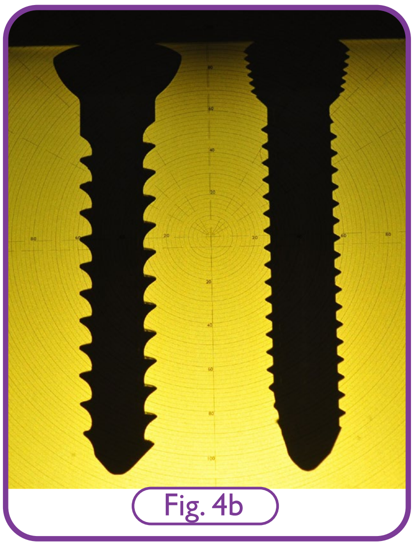


Fig. 3e. Shearing of the cis (near) cortex in an unstable construct.

- As the screws are not stable, non-locking plates have poor resistance to axial movements of the bone relative to the plate.

Advantages of Locking Plates

- Locking screw threads have a different design to non-locking screws (Figs. 4a and 4b). In locking screws, the core is wider, and the thread is finer and symmetric; this increases shear resistance by up to x2 and flexion resistance by up to x3 i.e. the screws are stronger. This only applies to purpose-made locking screws; it does not apply to non-locking screws that are used in locking applications.



Figs. 4a & 4b. A high resolution photograph and a shadowgraph image show the difference in thread pattern and difference in core diameter between a cortical screw (left) and a locking screw (right).

- Screws must be tight to ensure secure locking, but the risk of stripping the screw in the bone is eliminated. This is particularly advantageous in soft or poor-quality bone.
- The screw holding power is massively increased in soft or poor-quality bone due to the strength of the construct being derived from the screw head locking into the plate (Fig. 5), (as opposed to relying on the interface between the screw thread and the bone, as is the case with a non-locking construct).
- The plate-screw construct has much greater resistance to axial shear.
- The plate has only to be approximately contoured to the bone (Fig. 5). Perfect contouring to ensure plate-bone contact to generate friction is not necessary.
- The screws do not move the plate relative to the bone, or vice versa. There is therefore no potential to pull the bone into, or out of alignment (Fig. 5).
- Locking screws are angle stable and cannot rock or 'toggle' in the screw hole of the plate (Fig. 5). They can be safely placed as either mono-cortical or bi-cortical screws.
- The plate is not compressed onto the bone or periosteum (Fig 5.) There is therefore no known risk of causing vascular disturbances in the superficial bone.
- As the plate is not compressed onto the bone, it is suitable for minimally or less invasive application techniques, where there is less soft tissue dissection and elevation from the bone.

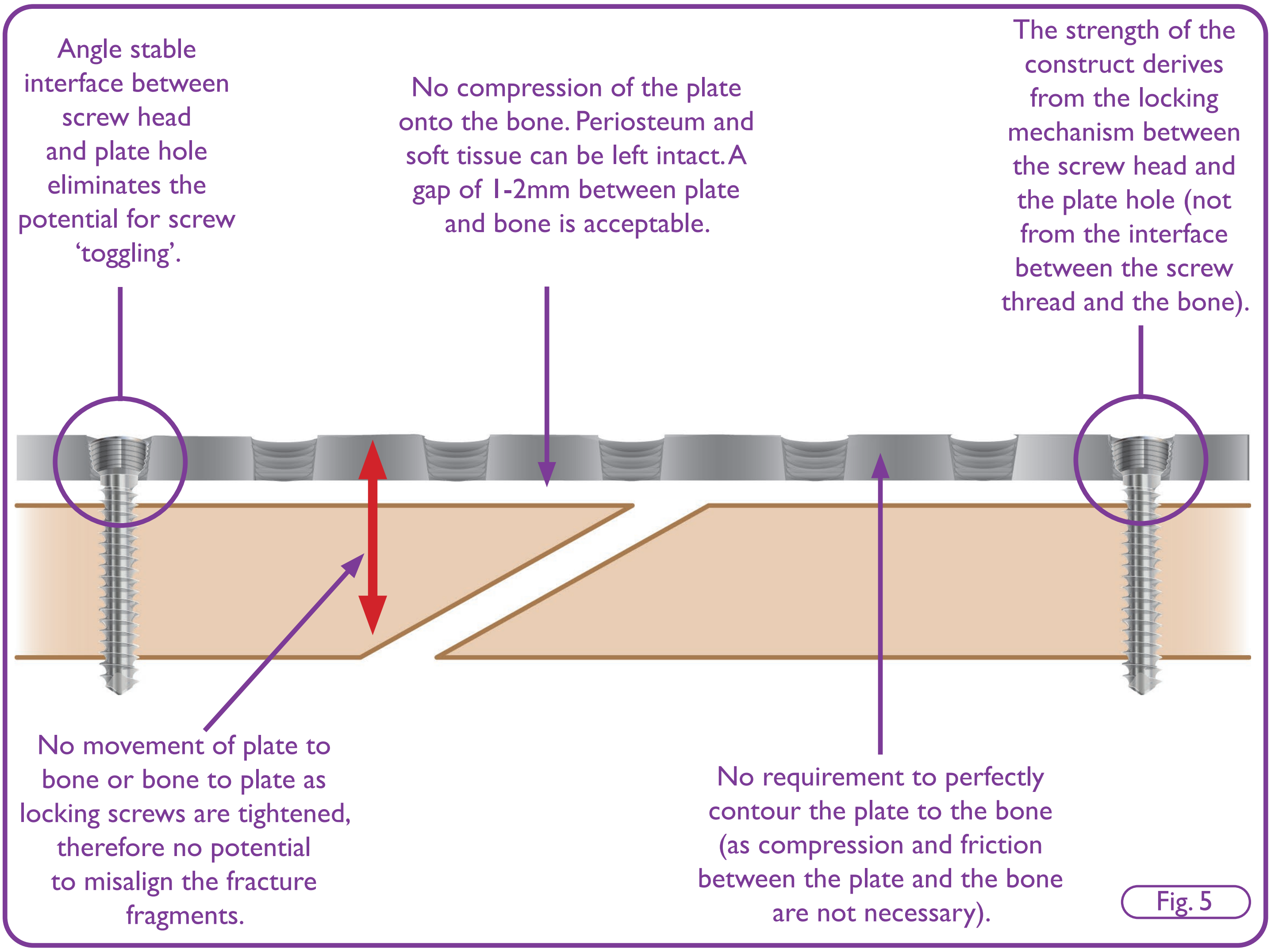
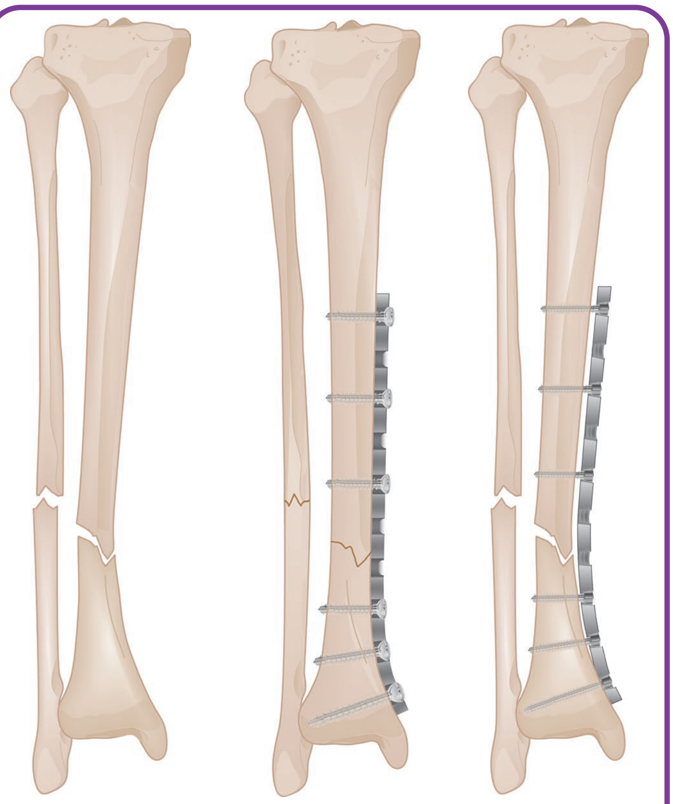


Fig. 5

Whilst there is the potential to cause misalignment of the fracture fragments with a non-locking plate (due to the movement of the bone and plate relative to one another as the screw is tightened), this feature can be utilised to pull a misaligned fracture into alignment. The locking plate cannot do this and will simply hold the bone in misalignment (Fig. 6a). Conversely, for a fracture that has been correctly aligned, a locking plate will hold the fracture in alignment; but a non-locking plate may pull the fracture out of alignment into misalignment (Fig. 6b).

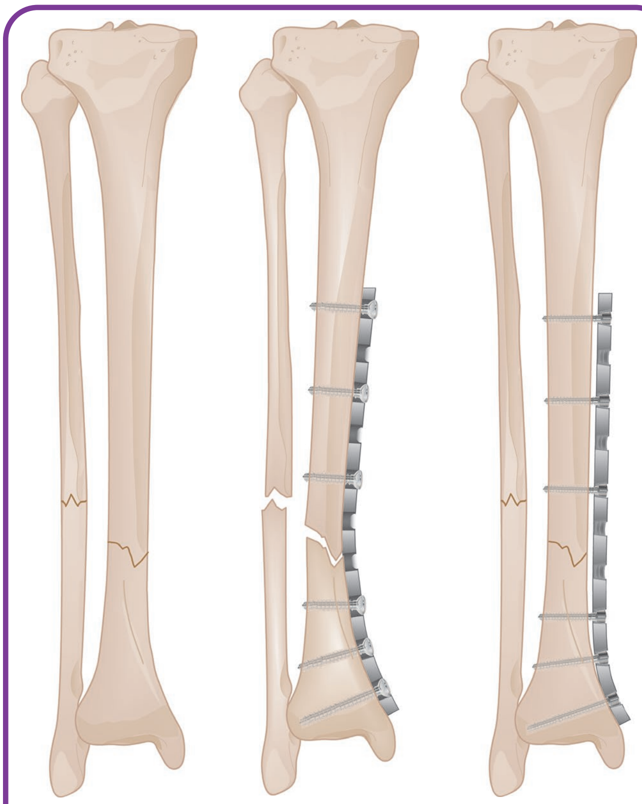


A misaligned fracture.

A non-locking plate can be used to pull a misaligned fracture into correct alignment...

… whereas a locking plate will hold the fracture in misalignment.

Fig. 6a



An aligned fracture.

A non-locking plate may pull an aligned fracture into misalignment...

… whereas a locking plate will hold the fracture in alignment.

Fig. 6b

Achieving Axial Compression with Locking Plates

Locking plates do not directly allow axial (dynamic) compression of the bone for compression of transverse fractures and osteotomies. To overcome this, some plate designs have a combination of locking and non-locking holes, or, as in the Vi Dynamic Locking Plate (DLP) (Fig. 7), figure-8-shaped combination holes that allow a choice between placement of a locking or a non-locking screw. The non-locking screws must always be placed first in any given segment of bone; once the fracture or osteotomy is compressed and appropriately aligned using non-locking screws, the plate and bone can then be "locked" using locking screws.

Fig. 7

When to Apply a Locking Plate?

For the majority of scenarios in small animal orthopaedics, non-locking plates work very well. However, there are situations in which locking plates are advantageous, including:

- When the bone is very soft or has poor implant holding properties e.g.
  - Proximal tibial bone e.g. TPLO surgery in dogs.
  - Pelvis/ilium bone, particularly in cats.
  - Pelvic bone for e.g. DPO or TPO surgery in puppies.
  - Distal (metaphyseal) radial fractures in dogs.
  - Young puppy and kitten bone.
  - Elderly patients.
  - Fracture revision where there are already multiple holes in the bone, or the bone is of poor quality because of disuse osteopenia.
  - Patients who have bone disease, for example:
    - Bone tumour.
    - Bone cyst.
    - Secondary hyperparathyroidism;

- When mono-cortical screws are to be placed e.g.
  - Screws to be placed very close to a joint.
  - Spinal screw e.g. spinal fracture or fusion.
  - Humeral condyle fractures; medial, lateral, Y, T and comminuted.
- When segments of bone are very short, limiting the number of screws that can be placed in each bone segment e.g. peri-articular fractures.
- Minimally invasive surgery where less dissection or minimal incisions are desirable.
- When axial compression is not needed/not desirable e.g. neutralisation or bridging plate applications.

Please refer to the case studies at the end of this Surgery Guide for examples of common indications for the use of locking plates.

Rules of Using Locking Plates

Most of the rules of non-locking plate application apply, with some key differences.

Mode of application: locking plates can be used as neutralisation plates and bridging plates. Locking plates cannot be applied as axial compression plates for transverse fracture; unless they are hybrid plates, such as the Dynamic Locking Plate (DLP) from Vi, in which case non-locking screws are used for axial compression.

Minimum screw number per segment of bone; the absolute number is unknown in small animal orthopaedics; a sensible minimum is 4 cortices or 2 bicortical screws per segment of bone.

Screw density: this is the overall percentage of the plate holes filled with screws in the completed construct. Average overall screw density is usually 40-50%, with no screws placed over the fracture and 50-75% of the screw holes filled over the ends of the bone. This gives an average screw stocking density of 40-50% (Fig. 8).

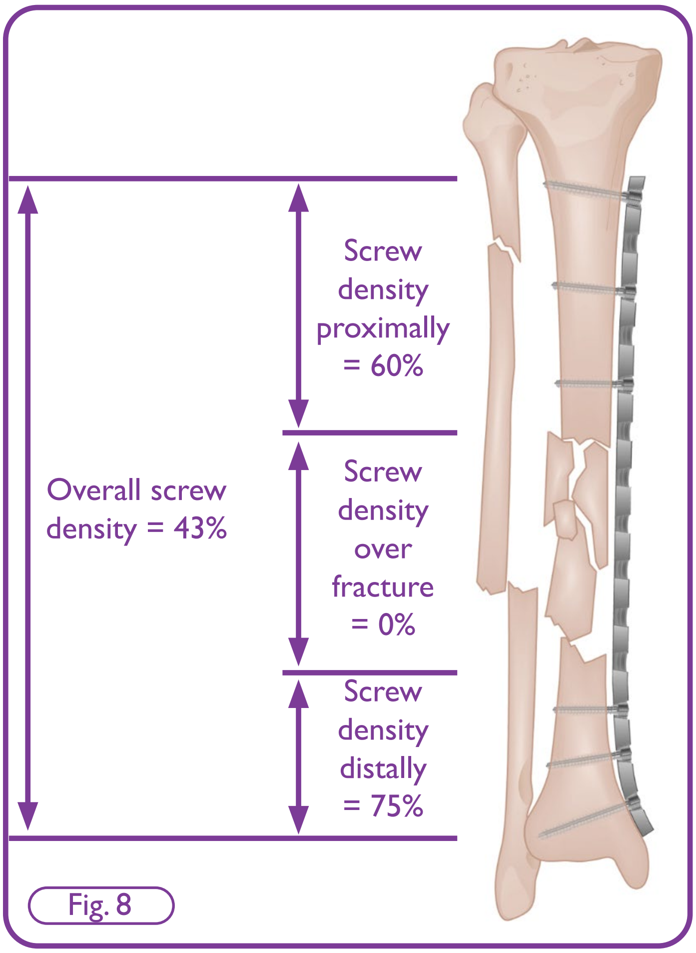


Fig. 8

Fig. 8 illustrates the concept of screw stocking density and target ratios.

Plate length: should be as long as possible, with the plate length being at least 2-3 times the length of the comminuted fracture, if possible.

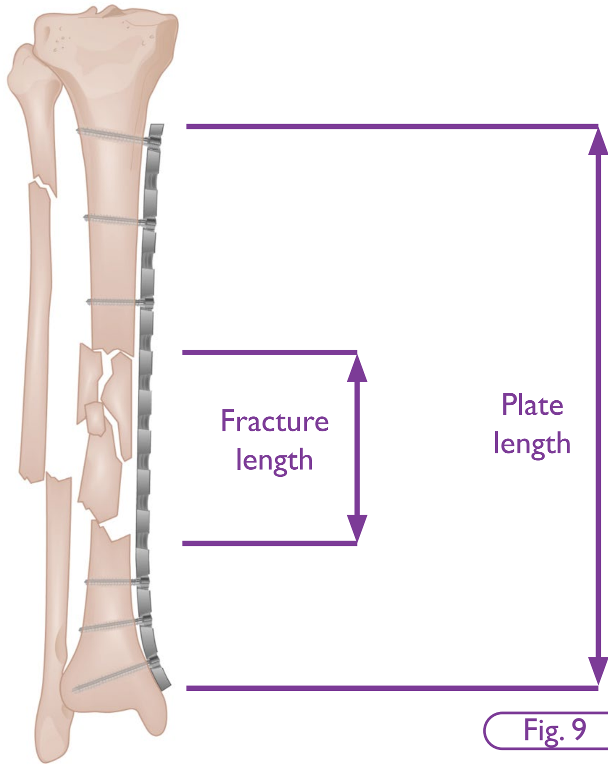


Fig. 9

Fig.9 illustrates the main point that plate length should be 2-3 times the length of comminution.

Plate length/fracture gap (bridging plate): It is not clear what the best configuration is for screw placement. Historic logic has been that the fracture gap should be left as long as possible; this is because a short fracture gap with screws close to the fracture may be liable to plate failure due to high fracture gap strain and high plate strain. Therefore, if the fracture gap is left long and screws placed away from the fracture, the chance of bone healing should be higher, and of plate failure should be lower. However, recent studies have shown that short working length constructs (with some screws placed close to the fracture) have higher yield strengths i.e. are actually stronger.

Large fracture gap & screws placed further away from fracture may reduce plate strain.

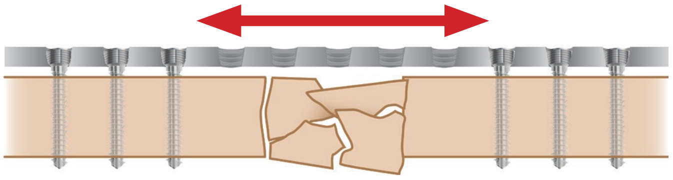


Fig. 10

Fig. 10 illustrates the principle that a longer working length may mean that the plate is less prone to fatigue failure.

Compression Plating of a Transverse Fracture with a Dynamic Locking Plate

For a transverse fracture, axial compression is appropriate and desirable (Fig.11). The DLP can be used in non-locking mode to achieve this, with the added benefit of the additional stability and strength of the locking mechanism for the non-compression screws. As the fracture is compressed with minimal or zero gap and there is relative stability, the bone should heal by primary bone healing.

Fig. 11

Key considerations for compression plating:

- Select the correct size of plate – see Vi plate selection chart (Appendix 1).
- The plate must be perfectly contoured to the bone.
- Use plate and/or bone (fragment) forceps to reduce the fracture and hold the plate in the correct position. This can be very challenging to achieve and takes skill and patience.
- Place the first screw as a non-locking cortical screw in the neutral position.
- On the other side of the fracture from the first screw, place the second screw as a non-locking cortical screw in the loaded position.
- Tightening this second screw will achieve axial compression across the fracture, assuming the bone fragments were in contact.
- A further compression screw may be applied on both sides of the fracture, if necessary, but it is very unusual to need more than 2 compression movements in total.
- If a second compression screw is placed, as the screw head engages the plate, the first screw on that side of the bone should be loosened half a turn; this is to allow a reduction in screw head-plate-bone friction to allow the bone to move (axial compression movement). Once the second compression screw has been fully tightened, the slightly loosened (first) screw must then be re-tightened.

- Place the remainder of the screws either as non-locking cortical screws in the neutral position, or as locking screws if clinically indicated (see below).
- All non-locking screws must be placed before locking screws in that segment of bone.
- Non-locking screws are placed using the appropriate Universal Drill Guide for DLP.
- Locking screws are placed using the appropriate Locking Screw Drill Guide, to ensure perfect positioning of the pilot hole at 90° relative to the plate hole.
- Usually, 1 or 2 non-locking screws are placed either side of the fracture, followed by 2-4 locking screws; total screw number = 3-5 screws per segment of bone.
- Locking screws are placed only after **all** the non-locking screws have been placed and confirmed to be tight.
- Locking screws make for a more secure construct and it is impossible to strip the thread of a locking screw in the bone. Locking screws are therefore preferred particularly in soft/poor quality or thin bone such as cancellous, metaphyseal bone including locations such as the tibial plateau or the ilial wing. However, locking screws cannot be angled (away from the fracture or the ends of the bone) and may, therefore, not be appropriate, possible or the best choice in all plate holes.

Great care must be taken combining the use of locking and non-locking screws; the surgeon must fully understand the principles and be sure to follow the correct rules as outlined above. Placing screws in the incorrect order (i.e. non-locking screws after locking screws) could result in catastrophic failure including bone fracture, screw fracture, screw pull-out, screw thread failure etc.

Scan the QR code to view a step-by-step video of application of a DLP in compression mode.

Neutralisation Plating of an Oblique or Spiral Fracture With a Dynamic Locking Plate

For an oblique or spiral fracture, primary stabilisation followed by placement of a neutralisation plate is usually appropriate (Fig. 12). A neutralisation plate protects the primary fixation. The primary repair reconstructs the fracture, compresses it and stabilises the fracture to some of the forces it is subject to, enabling the bone to take some load. However, the primary repair is not strong enough to withstand the full forces of weight bearing; left unprotected it would fail. Therefore the neutralisation plate neutralises the remaining forces on the bone, making the repair strong enough to withstand the full forces of weightbearing while the bone heals. As the fracture is compressed with minimal or zero gap and there is relative stability, the bone should heal by primary bone healing.

Fig. 12

Key considerations for neutralisation plating:

- Select the correct size of plate – see Vi plate selection chart (Appendix 1).
- The primary repair is usually carried out prior to placement of the plate; primary repair is typically achieved using lag screws or loaded positional screws (positional screws placed whilst the bone is held in compression with fragment forceps). Cerclage wire can be used for primary repair but it is more challenging to achieve a secure cerclage wire compared to a screw. Once the screws or cerclage wires are placed, the neutralisation plate is placed; it is easiest to do it in this order. However, if fracture alignment dictates, the lag or loaded positional screws may have to be placed directly through the plate; this is technically more challenging as the bone must be held in reduction, the plate contoured and held in position, and then the lag/loaded positional screws placed; all simultaneously.
- Please refer to the video linked in the QR code below, and to the Vi Guide to Plating with Non-Locking Plates and Screws, for further detail about lag screw placement.

- The plate can be approximately contoured if only locking screws are being used – a gap of 1-3mm between the plate and bone surface is acceptable. If non-locking screws are being used, the plate must be perfectly contoured to the bone.
- If using only locking screws, periosteal stripping is not required: the plate can be placed epi-periosteally and/or by a less- or minimally-invasive approach.
- Use plate and/or bone holding (fragment) forceps to hold the plate in position.
- The order of screw placement is not prescriptive. It is often convenient to start from the far ends of the bone/plate and work inwards, but this is not essential. The screws should be evenly spaced over the un-fractured proximal and distal sections of bone, avoiding the fracture.
- Typically 3-5 screws per bone segment are placed.
- If a combination of locking and non-locking screws are used, all non-locking screws must be placed **before** the locking screws per segment of bone.
- Non-locking screws, if used, must be placed in the neutral (non-compression) position – axial compression is not appropriate for a neutralisation plate.
- Non-locking screws are placed using the appropriate Universal Drill Guide for DLP.
- Locking screws are placed using the appropriate Locking Screw Drill Guide, to ensure perfect positioning of the pilot hole at 90° relative to the plate hole.
- Locking screws make for a more secure construct and it is impossible to strip the thread of a locking screw in the bone. Locking screws are therefore preferred particularly in soft/poor quality or thin bone such as cancellous, metaphyseal bone including locations such as the tibial plateau or the ilial wing. However, locking screws cannot be angled (away from the fracture or the ends of the bone) and may, therefore, not be appropriate, possible or the best choice in all plate holes.

Great care must be taken combining the use of locking and non-locking screws; the surgeon must fully understand the principles and be sure to follow the correct rules as outlined above. Placing screws in the incorrect order (i.e. non-locking screws after locking screws) could result in catastrophic failure including bone fracture, screw fracture, screw pull-out, screw thread failure etc.

Scan the QR code to view a step-by-step video of application of a DLP in neutralisation mode.

Bridging Plating of a Comminuted Fracture With a Dynamic Locking Plate

The DLP can be used in bridging mode when repairing a non-reconstructable comminuted diaphyseal fracture. The most common and practical way of using a DLP as a bridging plate would be in combination with an intramedullary pin; this is called a plate-rod construct (Fig. 13). The IM pin brings multiple advantages:

- During placement, it extends the fractured bone to the correct length.
- It holds the bone stable whilst the DLP is contoured and applied.
- It complements the plate mechanically as it has very strong resistance to bending forces whereas plates are weak to bending forces.

The plate-rod bridges the fracture fragments, maintaining bone length and alignment, allowing the fracture to heal by callus, also called secondary bone healing. A bridging plate construct i.e. plate and IM pin, must be strong enough to resist all the forces of weightbearing until the bone has healed, as there will be no load-sharing with the bone during the early phases of fracture healing.

Fig. 13

Key considerations for bridging plating:

- Select the correct size of plate – see Vi plate selection chart (Appendix 1). N.B. If there is a choice between plate sizes, the larger plate size is usually chosen for bridging mode.
- The IM pin is placed first and should be of a size appropriate to the patient.
    - Choose an IM pin that fills approx. 30-50% of the medullary cavity at the narrowest point, mid-diaphysis.
- Normograde insertion of an IM pin is preferred as it gives better control of the bone entry point. Retrograde pin insertion, whilst technically easier, gives no control over the exit point, so is not preferred.
- The plate should be as long as possible.
- The plate can be approximately contoured if only locking screws are being used – a gap of 1-3mm between the plate and bone surface is acceptable. If non-locking screws are being used, the plate must be perfectly contoured to the bone.
- If using only locking screws, periosteal stripping is not required: the plate can be placed epi-periosteally and/or by a less- or minimally-invasive approach.
- Use plate and/or bone (fragment) holding forceps to hold the plate in position.
- The order of screw position placement for a bridging plate is not prescriptive, although it usually is safest and convenient to work inwards from the ends of the plate.
- The screws can either be placed as far from the fracture as possible, or evenly distributed over the intact proximal and distal sections bone.
- If a combination of locking and non-locking screws is used, in any given bone segment all non-locking screws must be placed before locking screws.
- Non-locking screws, if used, must be placed in the neutral (non-compression) position – axial compression is not appropriate for a bridging plate.
- Non-locking screws are placed using the appropriate Universal Drill Guide for DLP.
- Locking screws are placed using the appropriate Locking Screw Drill Guide, to ensure perfect positioning of the pilot hole at 90° relative to the plate hole.
- Locking screws make for a more secure construct and it is impossible to strip the thread of a locking screw in the bone. Locking screws are therefore preferred particularly in soft/poor quality or thin bone such as cancellous, metaphyseal bone including locations such as the tibial plateau or the ilial wing. However, locking screws cannot be angled (away from the fracture or the ends of the bone) and may, therefore, not be appropriate, possible or the best choice in all plate holes.

Great care must be taken combining the use of locking and non-locking screws; the surgeon must fully understand the principles and be sure to follow the correct rules as outlined above. Placing screws in the incorrect order (i.e. non-locking screws after locking screws) could result in catastrophic failure including bone fracture, screw fracture, screw pull-out, screw thread failure etc.

Scan the QR code to view a step-by-step video of application of a DLP in bridging mode.

Locking Plate Case Studies

Long Bone Fracture

Transverse fractures of the distal radial & ulna diaphyses in a 3kg 5 month old Yorkshire Terrier (Figs. 14a and 14b).

- An 8 hole 1.5mm Vi DLP has been used.
- The plate has been perfectly contoured and pre-stressed in accordance with the principles of plating for transverse fractures.
- A non-locking screw has then been placed proximal and distal to the fracture, with the second screw in axial compression to compress the transverse fracture.
- Locking screws or non-locking screws could be used throughout in this case, but the last 2 screws placed (1 proximal and 1 distal) were chosen as locking to increase construct stability, particularly the most distal screw in soft metaphyseal bone that would otherwise have been at risk of stripping during terminal tightening.

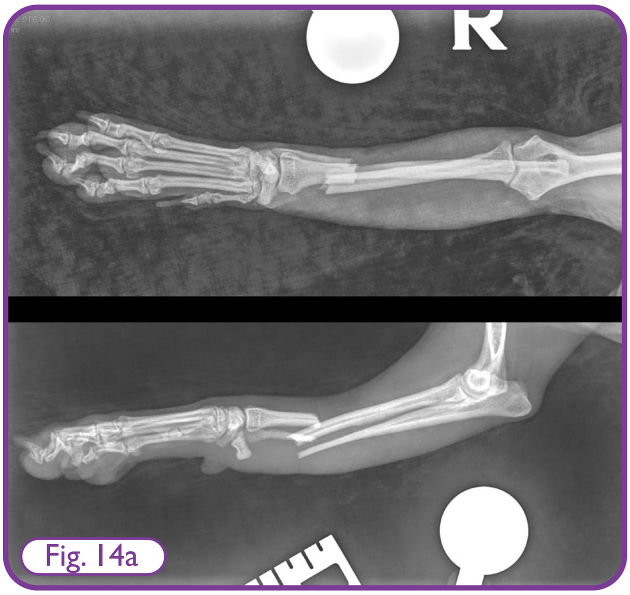


Fig. 14a

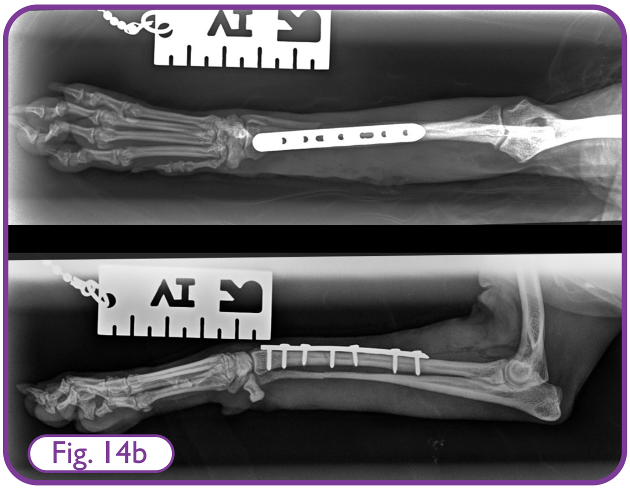


Fig. 14b

Ilial Body Fracture

Oblique ilial body fracture in a 5.7kg adult Shih Tzu (Figs. 15a and 15b).

- The fracture has been stabilised and compressed with 2 x 2.0mm lag screws, followed by placement of a lateral 6 hole Vi 2.4mm DLP with 1 non-locking and 2 locking 2.4mm screws either side of the fracture.
- The non-locking screws are used close to the fracture to bring the plate close to the bone and so that the screws can be directed away from the fracture.
- The locking screws are then placed; as the bone of the ilial body and wing are very thin, the risk of screw pull-out with non-locking screws is high; screw pull-out is much less likely with locking screws as their holding power in poor quality bone is superior.

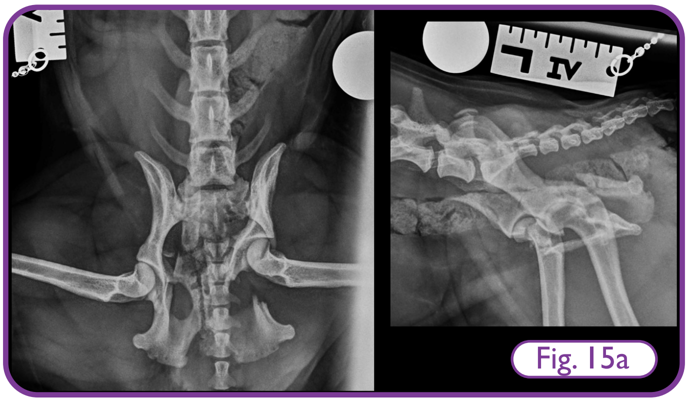


Fig. 15a

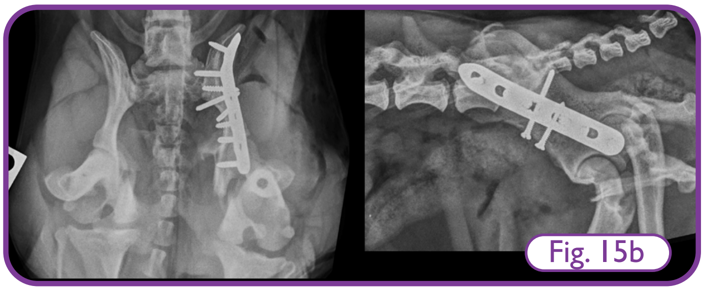


Fig. 15b

Lateral Humeral Condyle Fracture

Lateral humeral condyle fracture in a 4 month old 5kg French Bulldog puppy (Figs. 16a and 16b).

- The fracture has been repaired with a 3.5mm trans-condylar screw (loaded positional screw) followed by placement of a contoured 6 hole 2.0mm Vi DLP with 6 locking screws.
- The bone stock of the humeral condyle of young puppies is very limited, very soft and there are few safe corridors for screws.
- Locking screws are particularly advantageous for each of these problems as the plate does not have to be perfectly contoured to the bone and it is impossible to strip the thread of locking screws in soft bone (very soft in young puppies). Additionally, given the high risk of intra-articular penetration of a screw, mono-cortical screw application is acceptable (as locking screws are angle-stable, compared to non-locking screws which are not, meaning monocortical application is not recommended with non-locking screws).

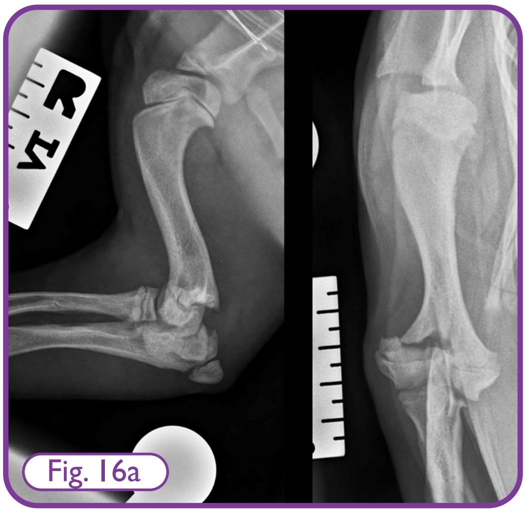


Fig. 16a

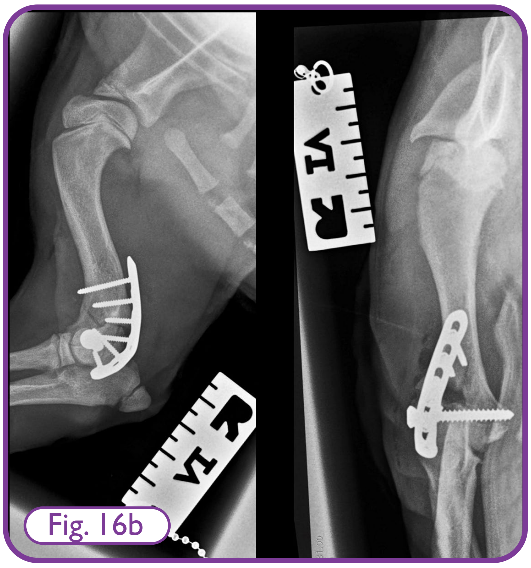


Fig. 16b

Radial Cut TPLO (Tibial Plateau Levelling Osteotomy)

TPLO as treatment for partial cranial crucial ligament rupture in a 30kg 4 year old Belgian Shepherd (Fig. 17).

- Locking screws are particularly advantageous for TPLO surgery as the metaphyseal bone of the tibial plateau is relatively soft; non-locking screws are prone to stripping.
- Using locking screws in the tibial plateau segment means that screw stripping is impossible.
- In addition, as perfect contouring and contact between the plate and bone is not necessary when locking screws are placed, this means that removal of the medial buttress (which frequently occurs secondary to cranial cruciate disease) is not necessary. This is preferable from a biological perspective; the locking screws in the plateau segment are simply driven through the medial buttress into the bone.
- The angle of the locking screws to the plate are pre-defined by the plate design, to avoid screw impingement into either the joint or the osteotomy.

Fig. 17

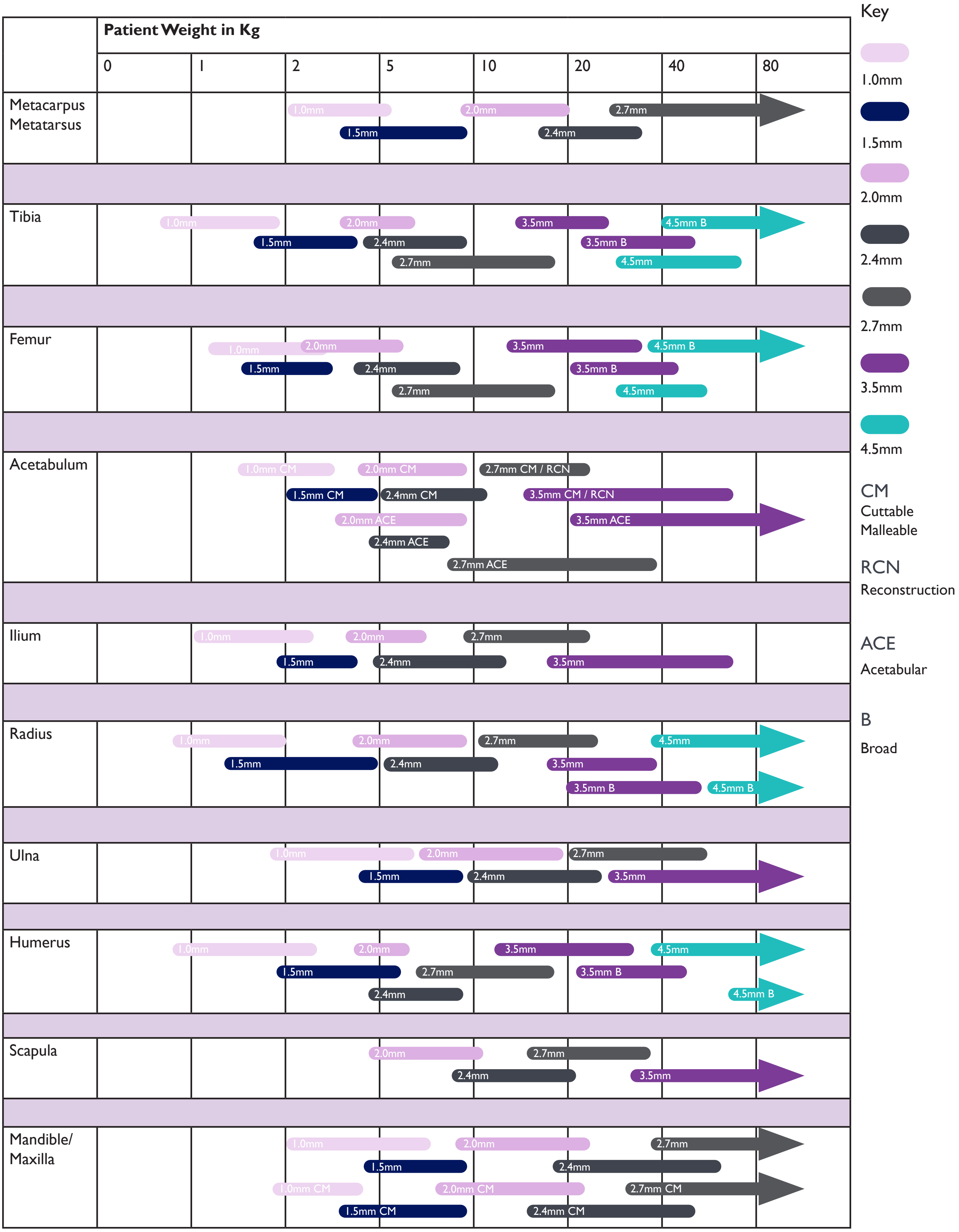
Other reading material:

- Surgery Guide - The Essentials of Fracture Management.
- Surgery Guide - Fixation of long bone (Diaphyseal) Fractures Using Non-Locking Plates and Screws.
- Surgery Guide - Linear External Skeletal Fixation.

With thanks to Gareth Arthurs PGCertMedEd MA VetMB CertVR CertSAS DSAS(Orth) FHEA FRCVS RCVS Recognised Specialist in Small Animal Surgery (Orthopaedics) for his invaluable assistance with this Surgery Guide, new for 2023.

Appendix I

Appendix I: The Vi implant selection chart is for guidance only. Precise implant selection depends on a number of factors which are to be considered when assessing the fracture healing score & the mechanical behaviour of implants. Unless otherwise stated, values apply to Vi compression, limited contact compression, ASYM®, round hole & biological healing plates. Scaled plate profiles are available in the catalogue or download the profiles from our website www.vetinst.com



Featured Products

Vi supply a full range of equipment for application of locking plates. The kits listed below represent the most clinically-current full plating kits available, but all components (plates, screws and associated equipment) are available to purchase separately.

Locking Plate & Screw Set In MPB

LS15STARDLPKITALLMPB	1.5mm Locking Screw Star Head & DLP Plate Kit in MPB
LS20STARDLPKITALLMPB	2.0mm Locking Screw Star Head & DLP Plate Kit in MPB
LS24STARDLPKITALLMPB	2.4mm Locking Screw Star Head & DLP Plate Kit in MPB
LS27STARDLPKITALLMPB	2.7mm Locking Screw Star Head & DLP Plate Kit in MPB
LS35STARDLPKITALLMPB	3.5mm Locking Screw Star Head & DLP Plate Kit in MPB

Locking Plating Kits In Premium Box

LS15STARDLPKITALL	1.5mm Locking Screw Star Head & DLP Plate Kit In Prem Box
LS20STARDLPKITALL	2.0mm Locking Screw Star Head & DLP Plate Kit In Prem Box
LS24STARDLPKITALL	2.4mm Locking Screw Star Head & DLP Plate Kit In Prem Box
LS27STARDLPKITALL	2.7mm Locking Screw Star Head & DLP Plate Kit In Prem Box
LS35STARDLPKITALL	3.5mm Locking Screw Star Head & DLP Plate Kit In Prem Box

Please contact a member of the Vi team for a list of the contents of these kits.

Locking Screw Sets

LS20STARKITMPB	2.0 Star Drive Locking Screw Set
LS24STARKITMPB	2.4 Star Drive Locking Screw Set
LS27STARKITMPB	2.7 Star Drive Locking Screw Set
LS35STARKITMPB	3.5 Star Drive Locking Screw Set

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