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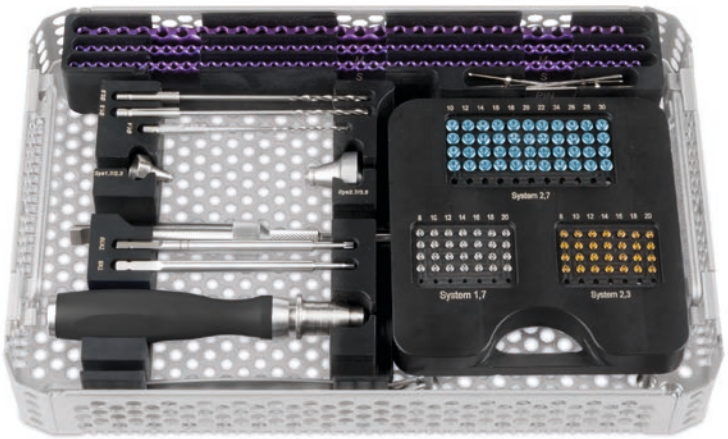
Telephone 020 8891 2007

EickLoxx Small

A universal osteosynthesis system for small animals up to 15 kg

With Specialist Article and Case Reports by Dr. Daniel Koch



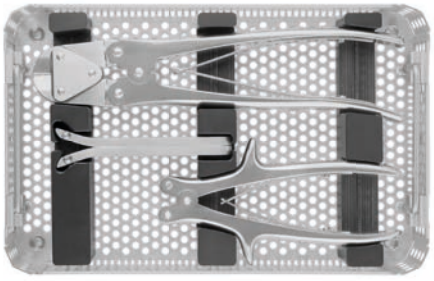
EICKLOXX SMALL OSTEOSYNTHESIS SYSTEM – COMPONENTS

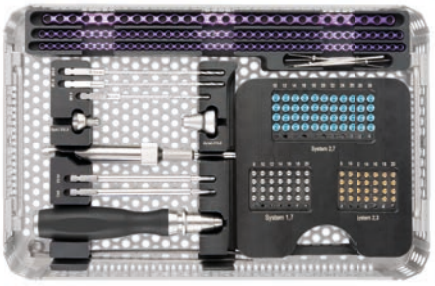
The EickLoxx Small is a polyaxial locking kit for dogs and cats up to 15 kg. The system distinguishes itself through the polyaxial placement of the custom-fit screws, combining the advantages of a locking plate system with polyaxial screw placement in ± 15° longitudinal and transverse pivoting.

Compared to conventional osteosynthesis systems, the use of internal fixation locking systems such as the EickLoxx Small facilitates faster healing of fractures and improved implant strength. It is for this reason that the removal of plates and screws is rarely indicated.

The biocompatible titanium plates are available in three sizes, can be cut to the desired length and be bent in three planes. Specially designed tools are included to perform this. Titanium also reduces artefacts in post-operative imaging.

EickLoxx Small is a modular system. All implants and instruments are made in Germany using only the highest quality raw materials.





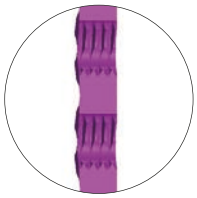
185500

Titanium EickLoxx Small Bone Plates

- Bendable, cuttable, twistable
- Multidirectional locking
- 46 hole Bone Plate, 230 mm x 5.0 mm x 2.0 mm, System 1.7 / 2.3
- 41 hole Bone Plate, 225 mm x 6.5 mm x 2.4 mm, System 1.7 / 2.3
- 28 hole Bone Plate, 224 mm x 8.0 mm x 2.7 mm, System 2.7 / 3.5

185518 – 185520

185518
Top view



185518
Cross-section

185518
Bottom view

Titanium Locking Screws

- Self-drilling, self-tapping
- 28 Titanium Locking Screw Ø 1.7 mm, silver, length: 8 – 20 mm
- 28 Titanium Locking Screw Ø 2.3 mm, gold, length: 8 – 20 mm,
- 44 Titanium Locking Screw Ø 2.7 mm, light blue, length: 10 – 30 mm

The geometry of the screw head and screw enables polyaxial placement with the Drill Guide System in ± 15° longitudinal and transverse pivoting.

185521 – 185545

The 46 / 41-hole bone plates can be locked with, or a combination of, 1.7 mm and 2.3 mm screws. The 28-hole bone plate can be locked with either 2.7 mm or 3.5 mm screws from the EickLoxx Large or the EickLoxx TPLO system.

185525

185532

185538

EICKLOXX SMALL OSTEOSYNTHESIS SYSTEM – CHARACTERISTICS

- EickLoxx Small bone plates minimise contact with the periosteum. This reduces the iatrogenic load on the bone perfusion common in conventional compression plates.
- Preservation of the bone perfusion significantly reduces the risk of infection and accelerates bone healing
- The risk of infection is further reduced through the biocompatibility of titanium and the absence of fretting

Illustrations

- Polyaxial placement with Drill Guide Funnel System in ±15° longitudinal and transverse pivoting (Fig. 1)
- 1.7 mm or 2.3 mm screws, combinable (Fig. 2)
- Use a core drill to drill hole. Plates can be bent in three planes (Fig. 3 and 4)
- Plate Bending Pliers with rollers (Fig. 5 and 6)
- Attention! Please avoid reverse bending of the plates (Fig. 7 and 8).
  Always bend plates in a slow and steady motion.
  Jerky movements are not tolerated by titanium or stainless steel.

Technical Specifications

- Titanium is the most biocompatible metal
- Polyaxial, bi- and monocortical locking
- Eliminates abrasion
- Geometrically optimised for maximal strength
- Plates can be bent in three planes

Biological Benefits

- Reduces damage to the vascular supply
- Increases resistance to infection
- Accelerates healing

Application

- For small animals up to 15 kg

Fig. 1

Fig. 2

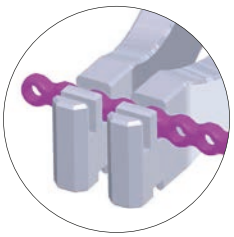


Fig. 3

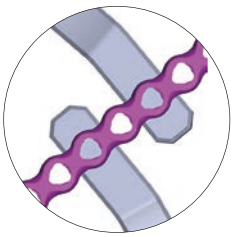


Fig. 4

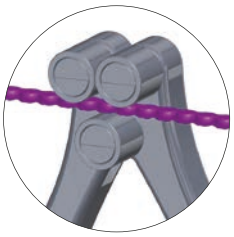


Fig. 5

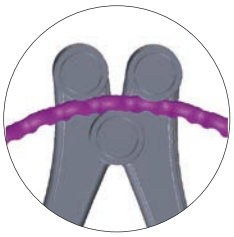


Fig. 6

Fig. 7

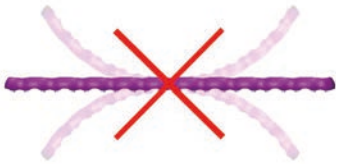


Fig. 8

Literature:
Perren SM, – Evolution of the internal fixation of long bone fractures. The scientific basis of biological internal fixation: choosing a new balance between stability and biology. J Bone Joint Surg Br. 2002 Nov;84(8): 1093-110.
P. Cronier et al. – the concept of locking plates – Orthopaedics & Traumatology: Surgery & Research (2010) 96S, S17–S36

EICKLOXX SMALL OSTEOSYNTHESIS SYSTEM – ITEM LIST

EickLoxx Small Osteosynthesis System		
Item No.	**Description**	**Quantity**
185500	Complete set, consisting of:	
185501	EickLoxx Small Instrument Tray, without instruments	1
185502	EickLoxx Small Implant Tray, without implants	1
185503	EickLoxx Small Screw Implant Module, without screws	1
185504	TAURUS Plates and Wire Cutting Pliers, L 230 mm, up to plates/wire thickness of 2.1 / 2.7 mm	1
185505	Plate Bending Pliers with Rollers	1
185506	EickLoxx Small Bending Levers, pair	2
185507	Twist Drill, Ø 1.4 mm, AO Quick Coupling	1
185508	Twist Drill, Ø 1.8 mm, AO Quick Coupling	1
185509	Twist Drill, Ø 2.0 mm, AO Quick Coupling	1
185510	Screwdriver Blade, Torx 6, AO Quick Coupling	1
185511	Screwdriver Blade, Torx 10, AO Quick Coupling	1
185515	Silicone Screwdriver Handle, cannulated, AO Quick Coupling, L 120 mm	1
185512	Drill Guide Funnel, multi-directional, 1.7 / 2.3	1
185513	Drill Guide Funnel, multi-directional, 2.7 / 3.5 / 4.0	1
185514	Plate and Screw Holding Forceps, titanium, angled, L 150 mm	1
185516	Plate Positioning Pin, Ø 1.4 x L 63 mm	4
185517	Depth Gauge, measuring range 30 mm, probe 1.0 mm	1
185518	EickLoxx Small Bone Plate, 46 holes, 1.7 / 2.3, titanium, magenta, dimensions (in mm): L 230 x W 5.0 x H 2.0	1
185519	EickLoxx Small Bone Plate, 41 holes, 1.7 / 2.3, titanium, magenta, dimensions (in mm): L 225 x W 6.5 x H 2.4	1
185520	EickLoxx Small Bone Plate, 28 holes, 2.7 / 3.5, titanium, magenta, dimensions (in mm): L 224 x W 8.0 x H 2.7	1
185521	Titanium Locking Screw, Ø 1.7 x L 8 mm, multi-directional, silver, Torx 6, self-drilling, self-tapping	4
185522	Titanium Locking Screw, Ø 1.7 x L 10 mm, multi-directional, silver, Torx 6, self-drilling, self-tapping	4
185523	Titanium Locking Screw, Ø 1.7 x L 12 mm, multi-directional, silver, Torx 6, self-drilling, self-tapping	4
185524	Titanium Locking Screw, Ø 1.7 x L 14 mm, multi-directional, silver, Torx 6, self-drilling, self-tapping	4
185525	Titanium Locking Screw, Ø 1.7 x L 16 mm, multi-directional, silver, Torx 6, self-drilling, self-tapping	4
185526	Titanium Locking Screw, Ø 1.7 x L 18 mm, multi-directional, silver, Torx 6, self-drilling, self-tapping	4
185527	Titanium Locking Screw, Ø 1.7 x L 20 mm, multi-directional, silver, Torx 6, self-drilling, self-tapping	4
185528	Titanium Locking Screw, Ø 2.3 x L 8 mm, multi-directional, gold, Torx 6, self-drilling, self-tapping	4
185529	Titanium Locking Screw, Ø 2.3 x L 10 mm, multi-directional, gold, Torx 6, self-drilling, self-tapping	4
185530	Titanium Locking Screw, Ø 2.3 x L 12 mm, multi-directional, gold, Torx 6, self-drilling, self-tapping	4
185531	Titanium Locking Screw, Ø 2.3 x L 14 mm, multi-directional, gold, Torx 6, self-drilling, self-tapping	4
185532	Titanium Locking Screw, Ø 2.3 x L 16 mm, multi-directional, gold, Torx 6, self-drilling, self-tapping	4
185533	Titanium Locking Screw, Ø 2.3 x L 18 mm, multi-directional, gold, Torx 6, self-drilling, self-tapping	4
185534	Titanium Locking Screw, Ø 2.3 x L 20 mm, multi-directional, gold, Torx 6, self-drilling, self-tapping	4
185535	Titanium Locking Screw, Ø 2.7 x L 10 mm, multi-directional, light blue, Torx 10, self-drilling, self-tapping	4
185536	Titanium Locking Screw, Ø 2.7 x L 12 mm, multi-directional, light blue, Torx 10, self-drilling, self-tapping	4
185537	Titanium Locking Screw, Ø 2.7 x L 14 mm, multi-directional, light blue, Torx 10, self-drilling, self-tapping	4
185538	Titanium Locking Screw, Ø 2.7 x L 16 mm, multi-directional, light blue, Torx 10, self-drilling, self-tapping	4
185539	Titanium Locking Screw, Ø 2.7 x L 18 mm, multi-directional, light blue, Torx 10, self-drilling, self-tapping	4
185540	Titanium Locking Screw, Ø 2.7 x L 20 mm, multi-directional, light blue, Torx 10, self-drilling, self-tapping	4
185541	Titanium Locking Screw, Ø 2.7 x L 22 mm, multi-directional, light blue, Torx 10, self-drilling, self-tapping	4
185542	Titanium Locking Screw, Ø 2.7 x L 24 mm, multi-directional, light blue, Torx 10, self-drilling, self-tapping	4
185543	Titanium Locking Screw, Ø 2.7 x L 26 mm, multi-directional, light blue, Torx 10, self-drilling, self-tapping	4
185544	Titanium Locking Screw, Ø 2.7 x L 28 mm, multi-directional, light blue, Torx 10, self-drilling, self-tapping	4
185545	Titanium Locking Screw, Ø 2.7 x L 30 mm, multi-directional, light blue, Torx 10, self-drilling, self-tapping	4

Optional Accessories		
Item No.	**Description**	**Quantity**
185557	Titanium Locking Screw, Ø 1.7 x L 6 mm, multi-directional, silver, Torx 6, self-drilling, self-tapping	1
185558	Titanium Locking Screw, Ø 1.7 x L 7 mm, multi-directional, silver, Torx 6, self-drilling, self-tapping	1
185559	Titanium Locking Screw, Ø 2.3 x L 6 mm, multi-directional, gold, Torx 6, self-drilling, self-tapping	1
185560	Titanium Locking Screw, Ø 2.3 x L 7 mm, multi-directional, gold, Torx 6, self-drilling, self-tapping	1
185555	Container, non-perforated bottom, perforated lid, silver, dimensions (in mm): L 312 x W 183 x H 122	1

EickLoxx Small

A polyaxial locking osteosynthesis system for cats and small dogs up to 15 kg

Locking osteosynthesis systems (or so-called fixateur interne) offer an enormous advantage where screws and plates form a stable unit compared to the long-time used DCP and LCP bone plates.

This not only ensures a significantly better holding force in the bone, but the plates do not press onto the bone, promoting blood circulation and leads to less frequent refractures after implant removal. ▶

Conventional systems

In conventional systems screws press the plate onto the bone as the screw is tightened. The threads of the screw pull and slightly deform the bone that the threads engage, and force occurs.

However, if axial forces are added to the compressive forces that occur more frequently during running and jumping effecting the long bones, then a second further component acts on the screw: shearing (shear effect). The shear effect (Fig. 1b) occurs in the proximal area of the screw below the plate, with the screw tip counteracting withdrawal forces at the counter cortical bone.

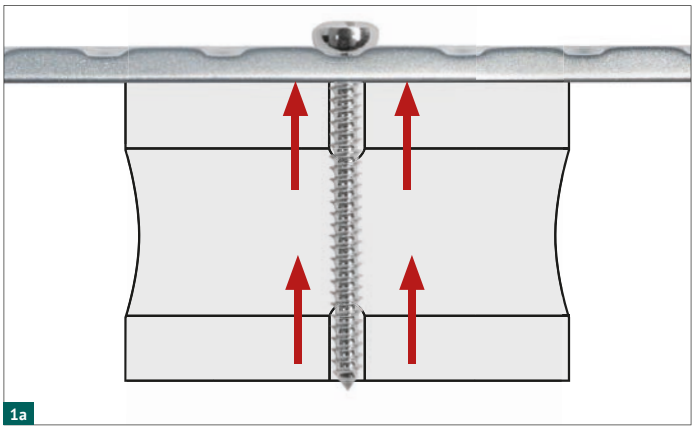


Fig. 1a: Effect of compression on the overall thread in contact with the bone (according to Cronier et al., 2010)

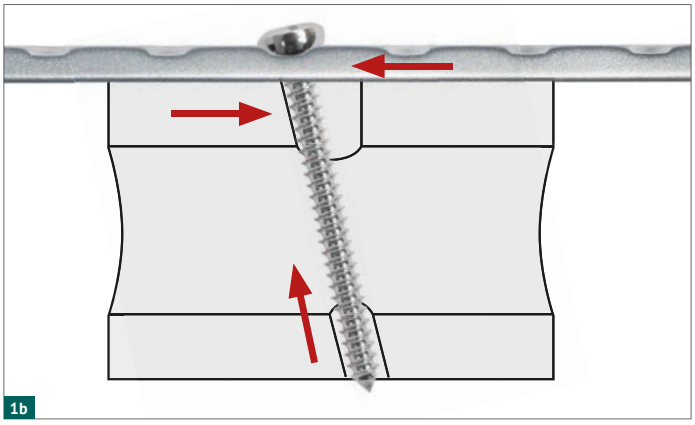


Fig. 1b: Shearing effect occurs on the proximal side of the screw only. The tip of the screw acts almost solely in relation to the pullout forces (according to Cronier et al., 2010)

Because bone is viscoelastic and remodels, the traction over the first several minutes after plate application reduces due to bone relaxation (material "creep"). Further loss of tension occurs over days and weeks due to remodelling of the living reacting bone (according to Cronier et al., 2010).

In conventional systems, caused by the pressure of the plate on the bone, significant vascular damage occurs. This can lead to delayed fracture healing and, after removal of the plate, to an increased risk of refractures (Perren, 2002).

Locking systems

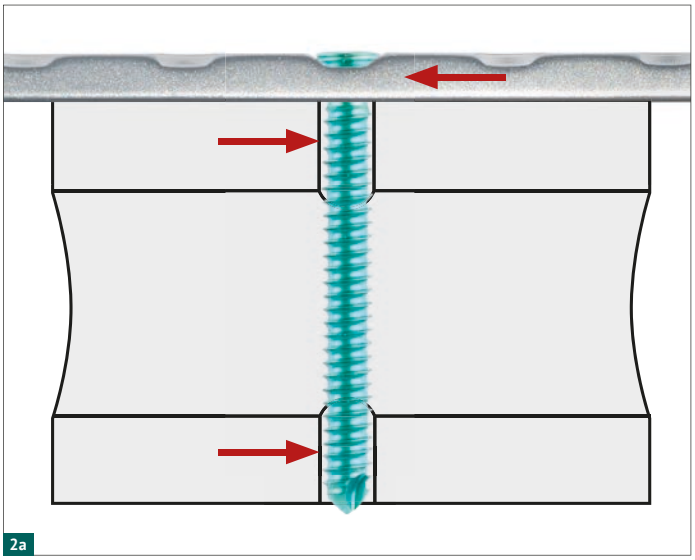


Fig. 2a: A locking screw resists shearing along its entire screw length (according to Cronier et al., 2010)

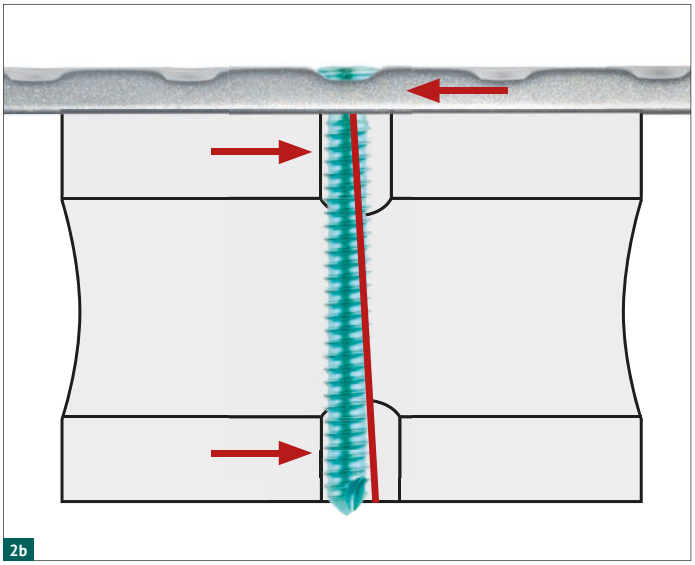


Fig. 2b: A locking screw also counteracts flexion forces (according to Cronier et al., 2010)

In contrast, locking systems such as the EickLoxx Small always function as "buttress systems" – even when they are applied to an anatomically reconstructed fracture (Fig. 2a and 2b). Because the plate is not pressed by the screws on the fracture, the fracture area can heal virtually unimpeded, which is especially advantageous in comminuted fractures with blood vessel injuries. In locking systems, the plate and screws form one unit.

For this reason, there is minimal loosening of the system through bone deformation under load (Fig. 3a) – in contrast, DCP or LCP and other non-locking systems, can experience the loosening of individual screws which can ultimately lead to the loss of the entire fixation Fig. 3b). ▶

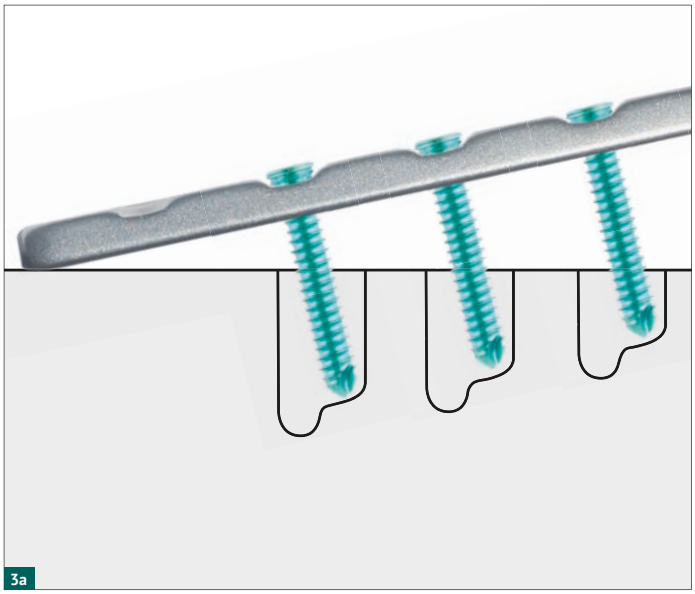


Fig. 3a: Locking System (according to Cronier et al., 2010)

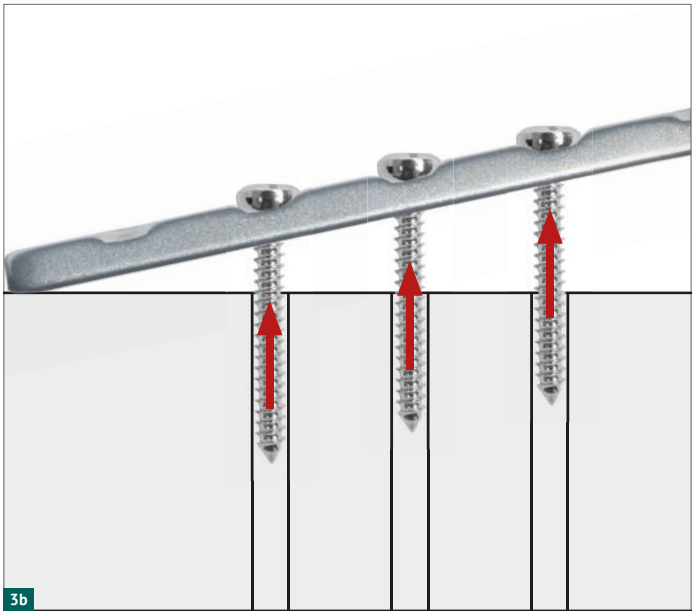


Fig. 3b: DCP or LC-DCP system (according to Cronier et al., 2010)

Figures 3a and 3b illustrate the pullout mechanism of the respective plate-screw connection principles under stress. In locking systems, the head thread of the screw is screwed into the plate hole thread. This creates a mechanically stable connection between the screws and plate, or the locking results.

The screws of interlocking plates act as transverse supporting members, subjected to cantilever bending. The primary loads on the bone during weight-bearing are axial, along the long axis of the bone. Here, there is no pulling of the plate down to the screw, so the likelihood of pullout of the screw is reduced. Importantly, the screw is an integral part of the transmission of forces across fracture sites. Locking systems invariably function in a support capacity.

Screw characteristics

Locking screws differ from conventional cortical screws. The core diameter of a locking screw is bigger and has a fine-pitched thread compared with conventional bone screw threads (Fig. 4a and 4b).

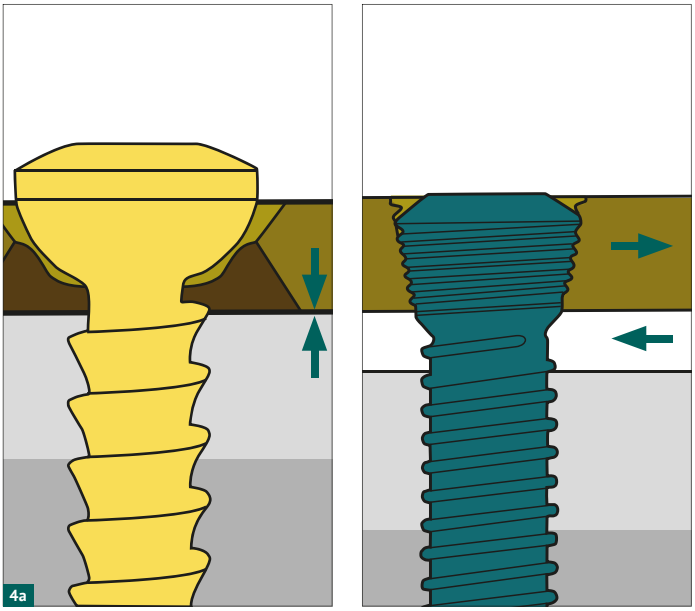


Fig. 4a: Conventional screw, locking screw (according to Cronier et al., 2010)

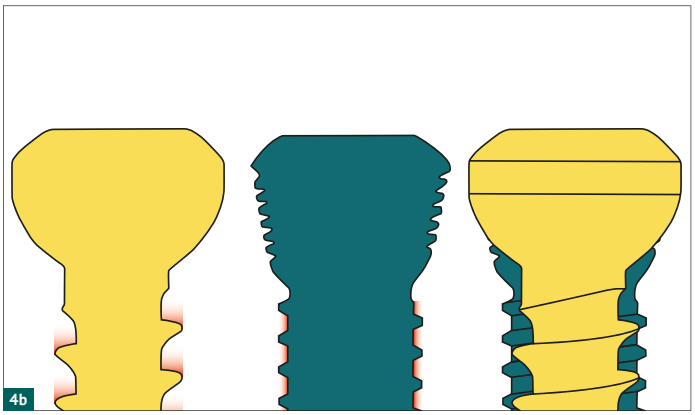


Fig. 4b: Differences in the diameter of conventional and locking screws (according to Cronier et al., 2010)

Due to this improved holding force of the screws, (determined by the locking mechanism screw head thread in the plate hole thread, as well as the screw characteristics) they can also be used monocortical. This is an advantage especially for small dogs and cats or in the use of additional intramedullary nails.

EickLoxx Small Osteosynthesis System

The most important steps for handling the EickLoxx Small Osteosynthesis System and the description of the components are shown in Figures 5 to 9. ▶

Fig. 5: The 1.7 mm and 2.3 mm locking screws can be combined with each other in the 2.0 x 5.0 mm and 2.4 x 6.5 mm plates.

Polyaxial positioning of the screws also gives the surgeon flexibility when guiding the screws in the area close to the joint.

The geometry of the screw heads and screw holes enables multidirectional screwing in via a jig funnel in ±15° longitudinal and transverse pivoting (with the funnel-shaped drill sleeve being screwed vertically into the screw hole).

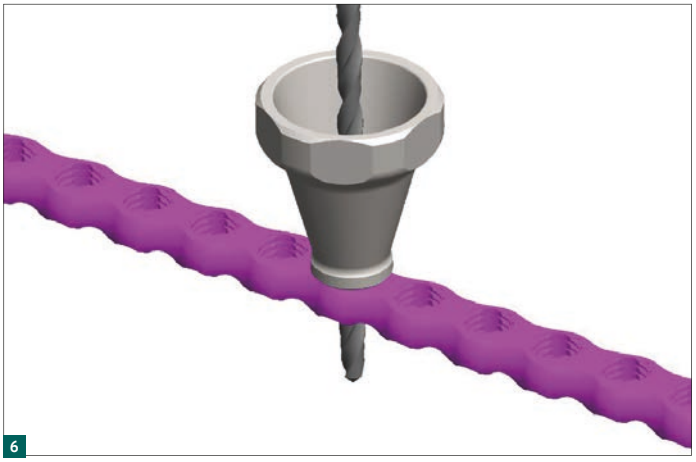


Fig. 6: The drill guide funnel is screwed vertically into the plate hole thread. With the twist drill, the inclination of the locking screws can be determined (up to ±15° longitudinal and transverse pivoting).

Another advantage of the EickLoxx Small locking plate system is that it has a modular design. There are three plate thicknesses available (2.0 mm, 2.4 mm and 2.7 mm) which can be cut as required and are bendable in all three planes, thanks to special tools. The surgeon also has the option of using 1.7 mm or 2.3 mm size screws for the two smaller plates. The largest of the three currently uses 2.7 mm and 3.5 mm screws (refer to chapters 2, EickLoxx Large and 7.3, EickLoxx TPLO). Thus, the EickLoxx Small allows the surgeon a maximum of flexibility and modularity.

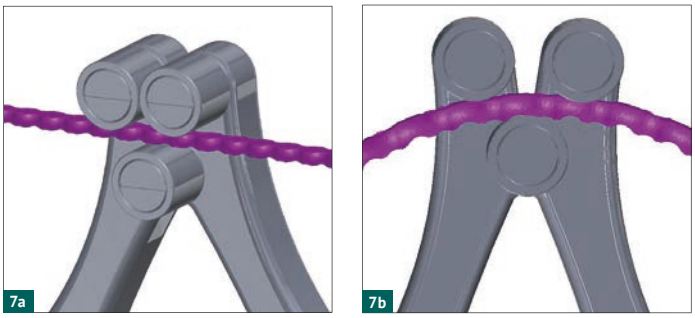


Fig. 7a and 7b: When an EickLoxx plate is bent in the plane of the plate, the holes remain round because of the special mechanism of the bending pliers with rollers.

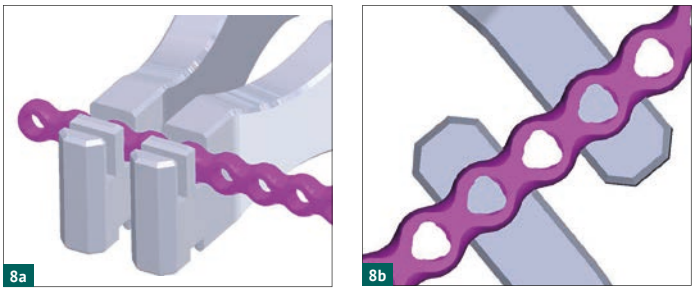


Fig. 8a and 8b: Bending a plate perpendicular to the plate plane

Summary

- EickLoxx Small is a flexible and modular plate – osteosynthesis system for cats and small dogs up to 15 kg
- EickLoxx bone plates minimise contact with the periosteum and thus reduce the iatrogenic load on the bone perfusion, common in conventional compression plates.
- Preservation of perfusion significantly reduces the risk of infection and accelerates bone healing.
- Resistance to infection is also enhanced by the biocompatibility of titanium and the absence of fretting.

Literature:
P. Cronier, G. Pietu, C. Dujardin, N. Bigorre, F. Ducellier, R. Gerard. The concept of locking plates. Orthopaedics & Traumatology: Surgery & Research (2010); 96S: S17–S36.
S.M. Perren. Evolution of the internal fixation of long bone fractures. The scientific basis of biological internal fixation: choosing a new balance between stability and biology. J Bone Joint Surg Br. (2002); Nov; 84(8): 1093-110.

Dr. Daniel Koch
Specialist in small animal surgery; DECVS

Specialist in small animal surgery; DECVS; Specialisations: joint surgery, osteosynthesis, airway obstruction and dental treatment; Research areas: brachycephalic syndrome, knee joint of the dog.

Case Report 1

Dr. Daniel Koch, Diessenhofen, Switzerland, June 18th, 2018
cat, 1 year, 2 kg, car accident 4 days ago, femur diaphysis fracture, right

I used the EickLoxx Small system for the first time.

Conclusion: very good, applicable, looks very stable, simple handling, fast OR.

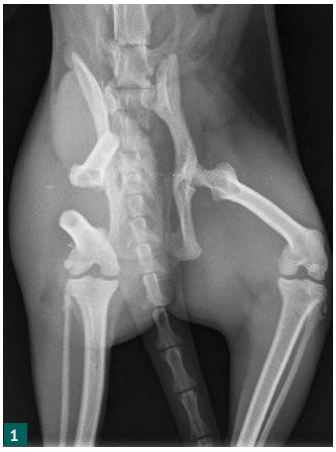


Fig. 5: cut the plate between the holes ...

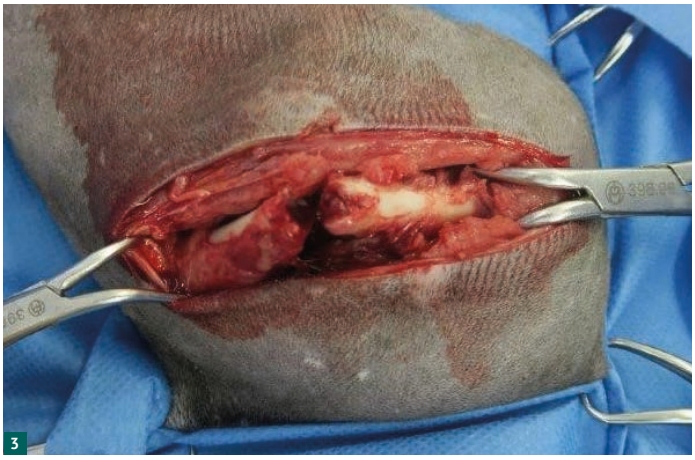


Fig. 3: bone fragments repositioning

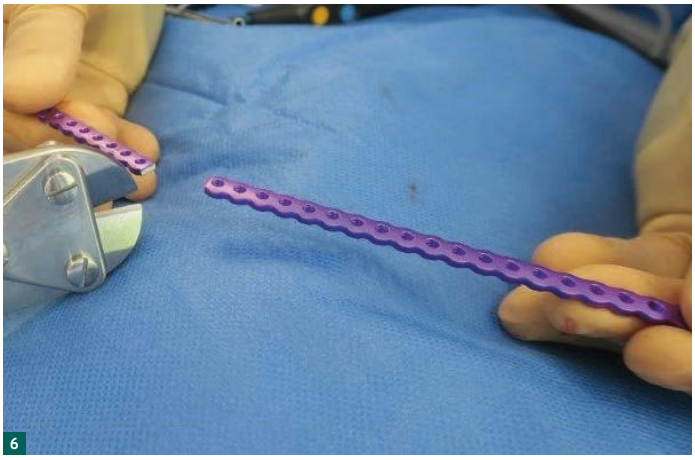


Fig. 6: ... to the length measured intraoperatively

Fig. 4: in situ measuring of the plate length

Fig. 7: in-plane plate-bending with the Plate Bending Pliers with Rollers

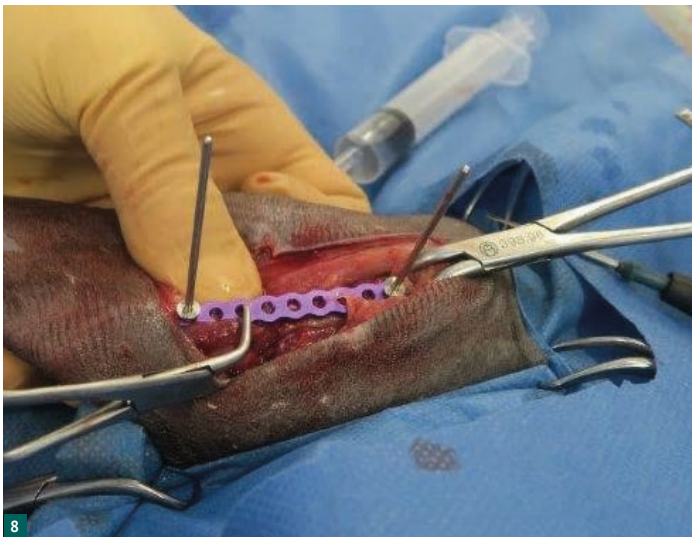


Fig. 8: insertion of the Plate Positioning Pins

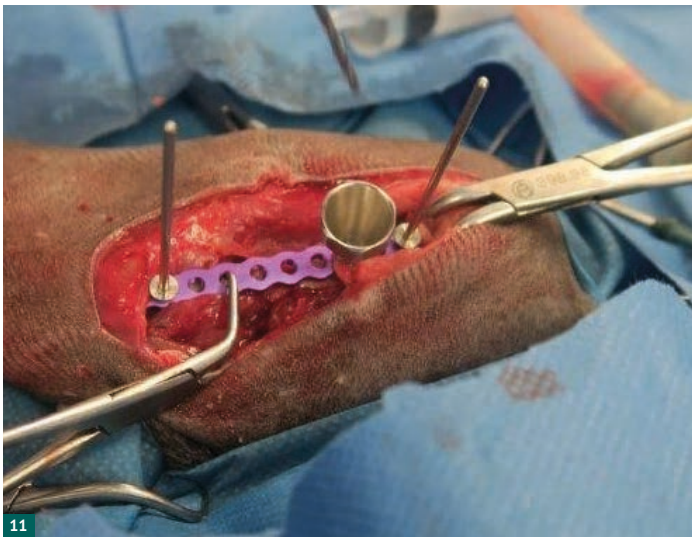


Fig. 11: ...otherwise the Drill Guide Funnel cannot be screwed on

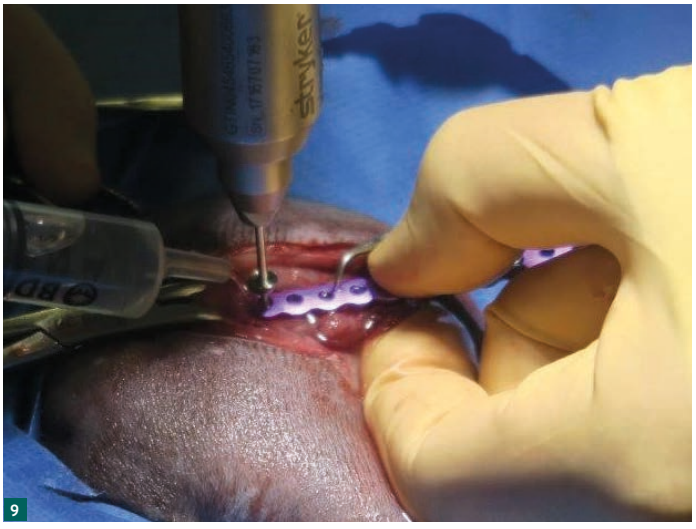


Fig. 9: screwing in of the Plate Positioning Pin for temporary plate fixation

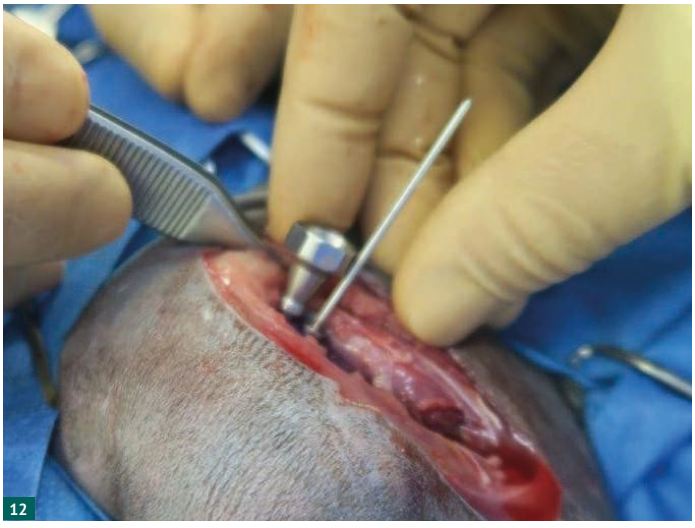


Fig. 12: the Drill Guide Funnel is too close to the Plate Positioning Pin

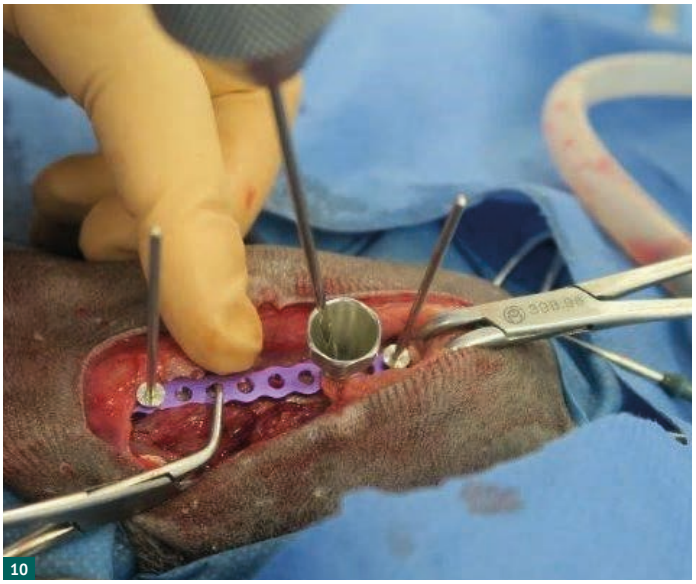


Fig. 10: in the case of temporary plate fixation, care must be taken to leave at least a one hole gap between the Plate Positioning Pins and the Drill / Sleeve Guide Funnel, ...

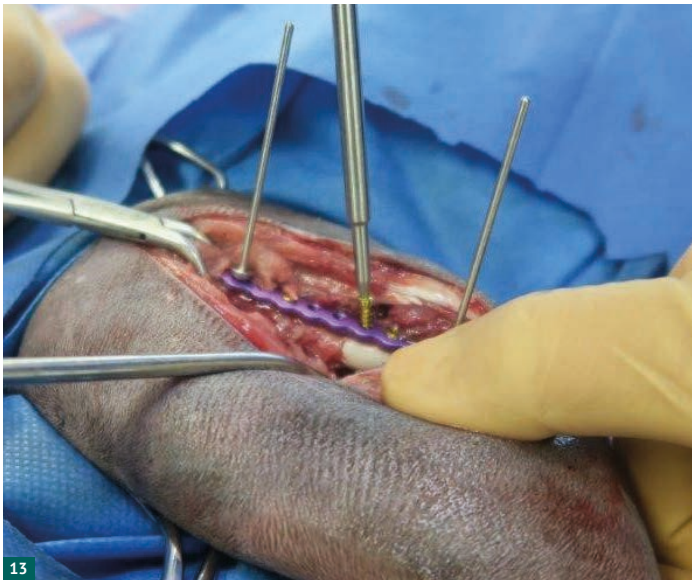


Fig. 13: screwing in the locking screw in an angle of ± 15° in longitudinal and transverse pivoting is possible

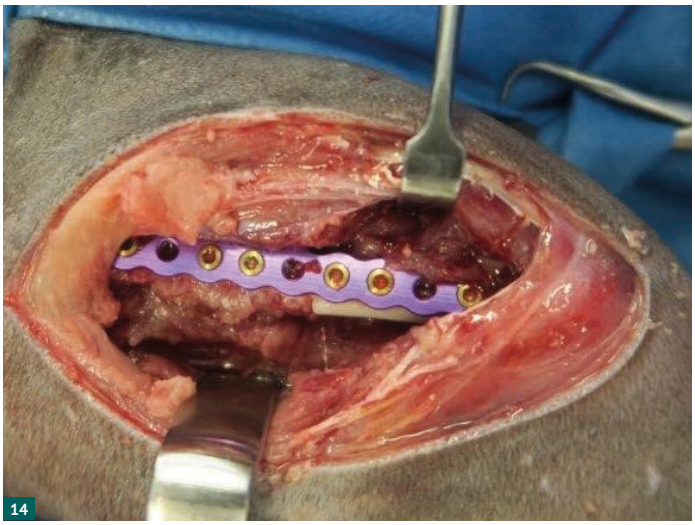


Fig. 14: compared to a conventional plate-screw-system, like DCP/LCP, there is no need for every screw hole to have a screw (because locking systems like the EickLoxx Small form a stable plate and screw unit)

Case Report 2

Dr. Daniel Koch, Diessenhofen, Switzerland, June 25th, 2018
Yorkshire Terrier, 6 months, 1.7 kg, radius / ulna fracture

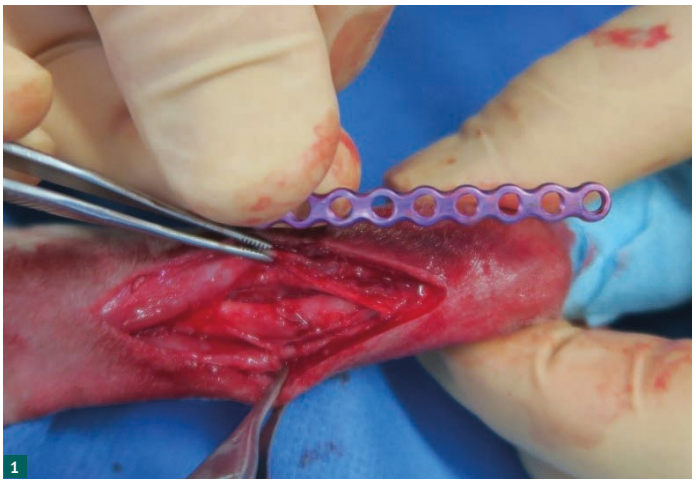


Fig. 1: use of 5.0 x 2.0 mm plate cut to a 9 hole plate length

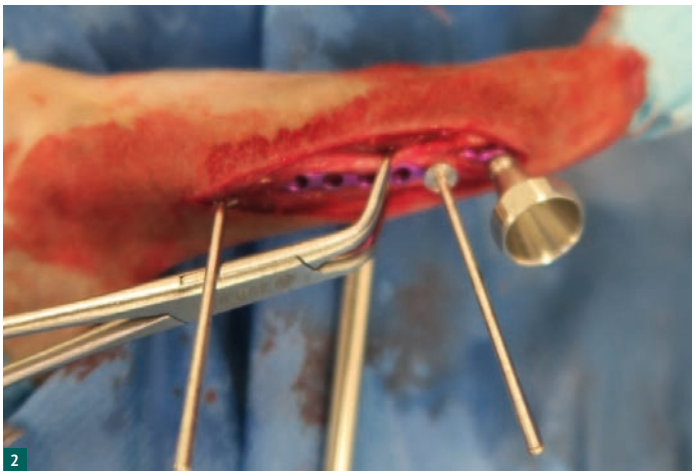


Fig. 2: plate with 2 Plate Positioning Pins …

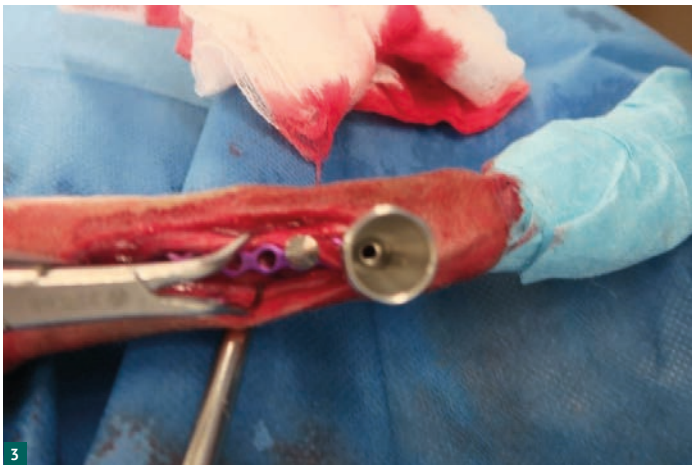


Fig. 3: …and screwed on Drill Guide Funnel

Fig. 4: fracture with the 9 hole plate, length approximately 4.5 cm with 7 x 2.3 mm screws fixed

Fig. 5 & 6: Yorkshire Terrier, 6 months, 1.7 kg, radius/ulna fracture

Case Report 3

Dr. Daniel Koch, Diessenhofen, Switzerland, July 24th, 2018
cat, 4 years, accident, ileum fracture

First tried conservatively, then 3 weeks later osteosynthesis at the ilium with EickLoxx Small. The repositioning took time and effort due to the proximity of the hip joint, but the ability to angle the screws allowed for a much better lock with the plate.

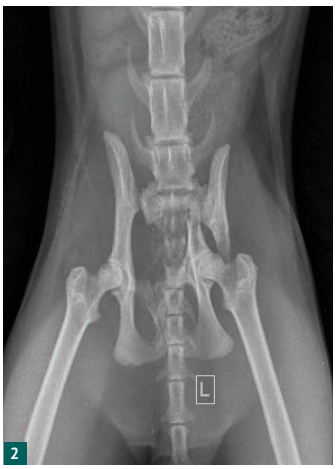


Fig. 5: Plate with Plate Positioning Pin and first 2.3 mm screw

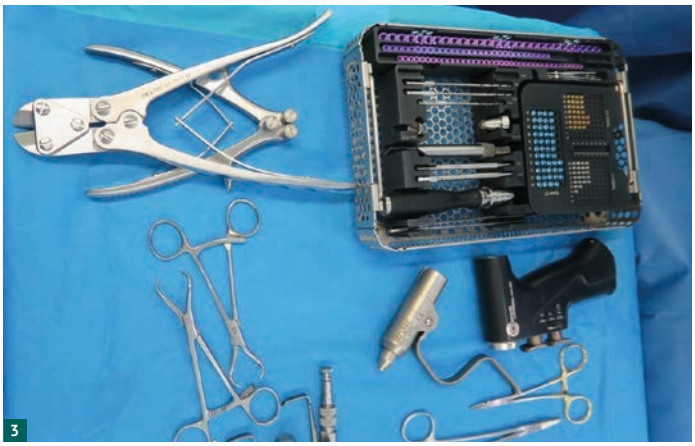


Fig. 3: EickLoxx Small osteosynthesis system, necessary instrumentation and orthopaedic drill.

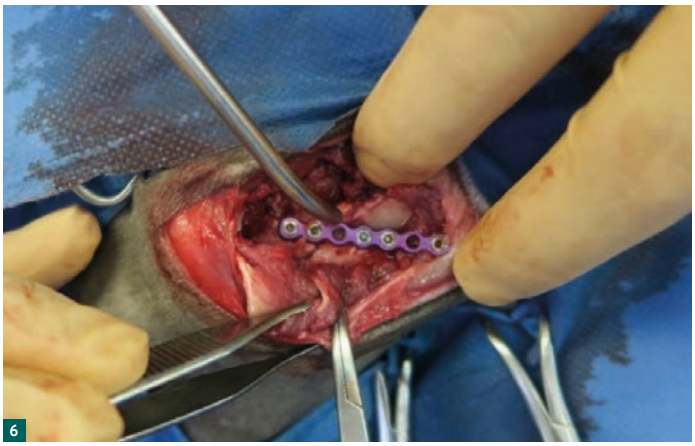


Fig. 6: 5 x 2.3 mm screws locked multidirectionally

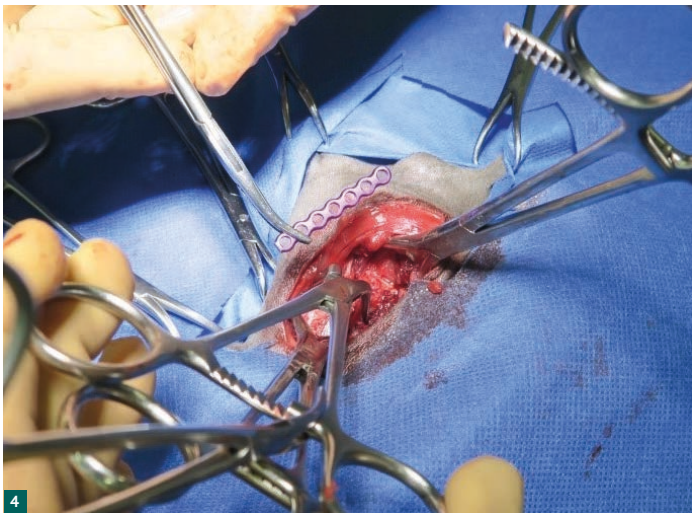


Fig. 4: Use of a 5.0 x 2.0 mm plate cut to a 7 hole plate, length approximately 3.5 cm

Case Report 4

Dr. Daniel Koch, Diessenhofen, Switzerland, August 6th, 2018
Maine Coon cat, 2 years, 7 kg GG, Monteggia fracture

Maine Coon cat, 2 years, 7 kg GG, fell 7 m, Radial head luxation and Ulna fracture (so called Monteggia fracture). Treated today with plate at the Ulna and loop technique according to Koch.

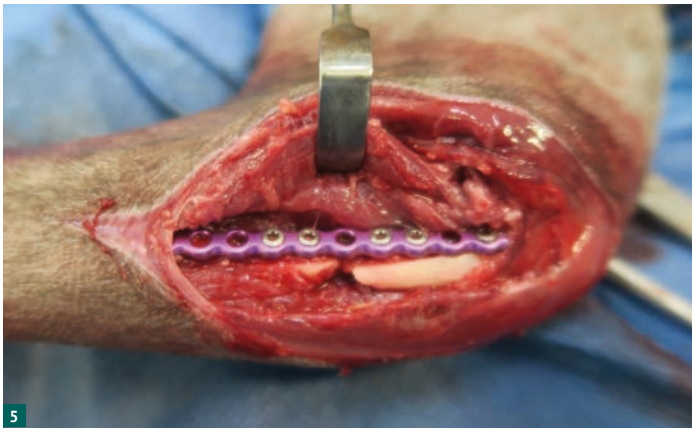


Fig. 5: Locking with 7 x 2.3 mm screws, partially multidirectional, on a 10 holes cut plate about 5.0 cm length

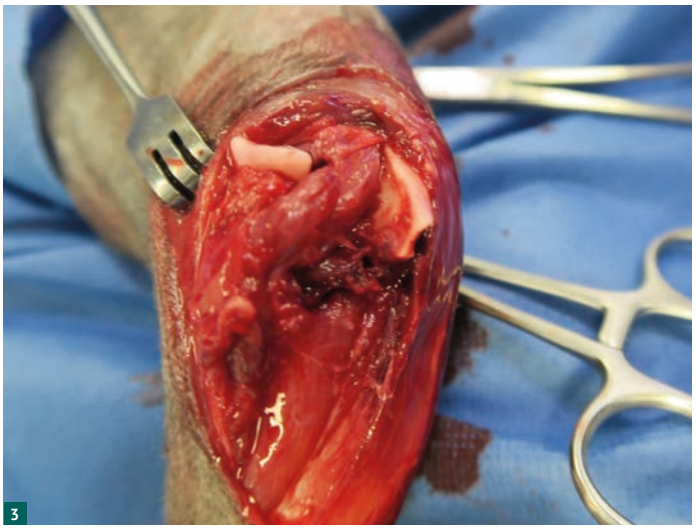


Fig. 3: OR – elbow status

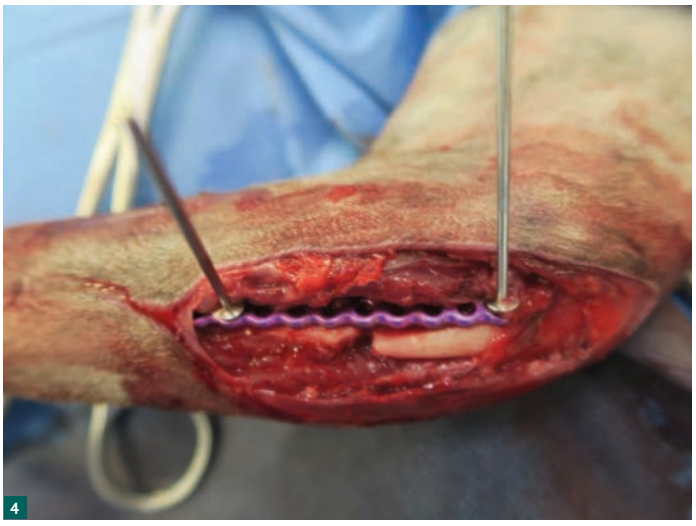


Fig. 4: use of a 5.0 x 2.0 mm plate with two Plate Positioning Pins for temporary plate fixation

Case Report 5: Simple repair of Monteggia fractures in the cat

Case report

Scan the QR code to see the Case Report (in German)

SAT | ASMV 11 | 2017 Volume 159, Issue 11, November 2017, 601–604, © GST | SVS

Monteggia fractures are rare traumatic injuries in cats and dogs. Ulna repair is mostly achieved by plates. Stable radial head fixation however is challenging. Temporary position screws have to be removed due to rotation forces in the elbow joint causing screw loosening. We present a novel and simple method using a sling technique, which holds the radial head in its physiological position and allows normal elbow movement.

Keywords:
Monteggia, fracture, radius, ulna, osteosynthesis, sling

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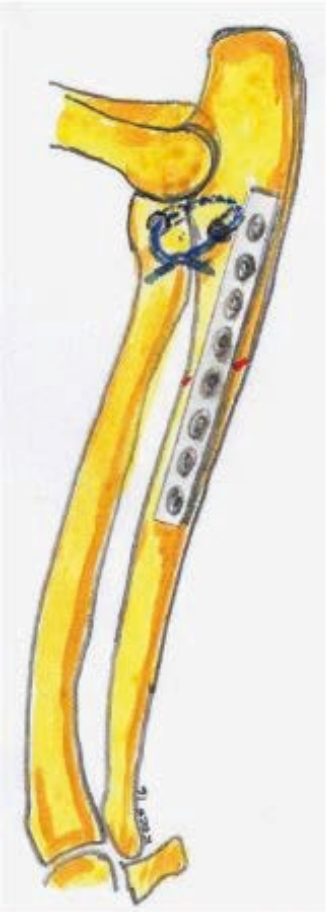

Schematic illustration of the suture guidance for reposition and position holding of the radial head in Monteggia fractures.

EickLoxx Small application video (in German)

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06/2024