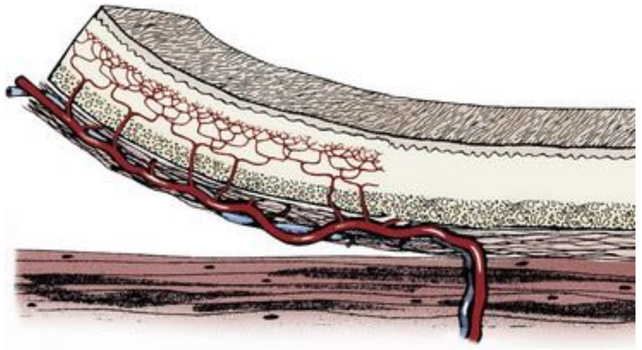
Advanced reconstruction techniques



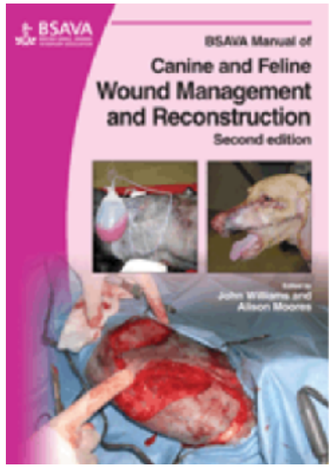
Dr. Vladislav Zlatinov
Central Vet Clinic - Sofia, Bulgaria

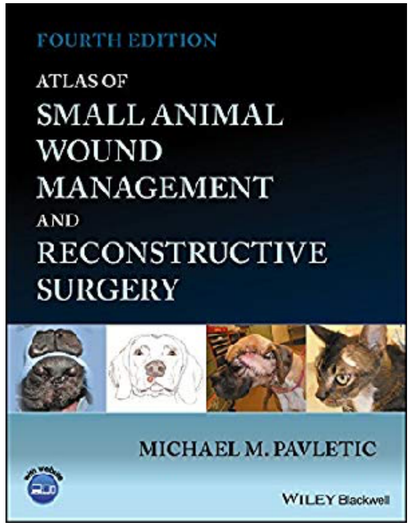
Definition of reconstructive surgery

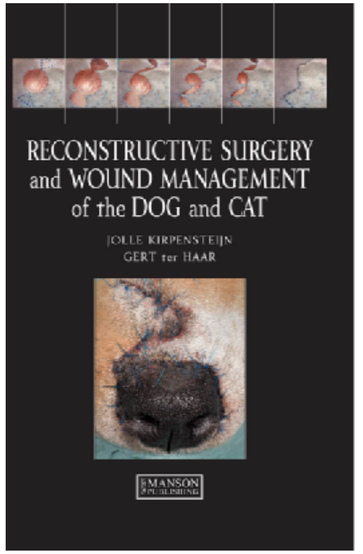
Surgery to **restore function or normal appearance** by reconstructing defective organs or parts.

Goal of the presentation

- **Extensive** topic.
- **Common principles and specific cases** will be presented.







Numerous **textbooks**.

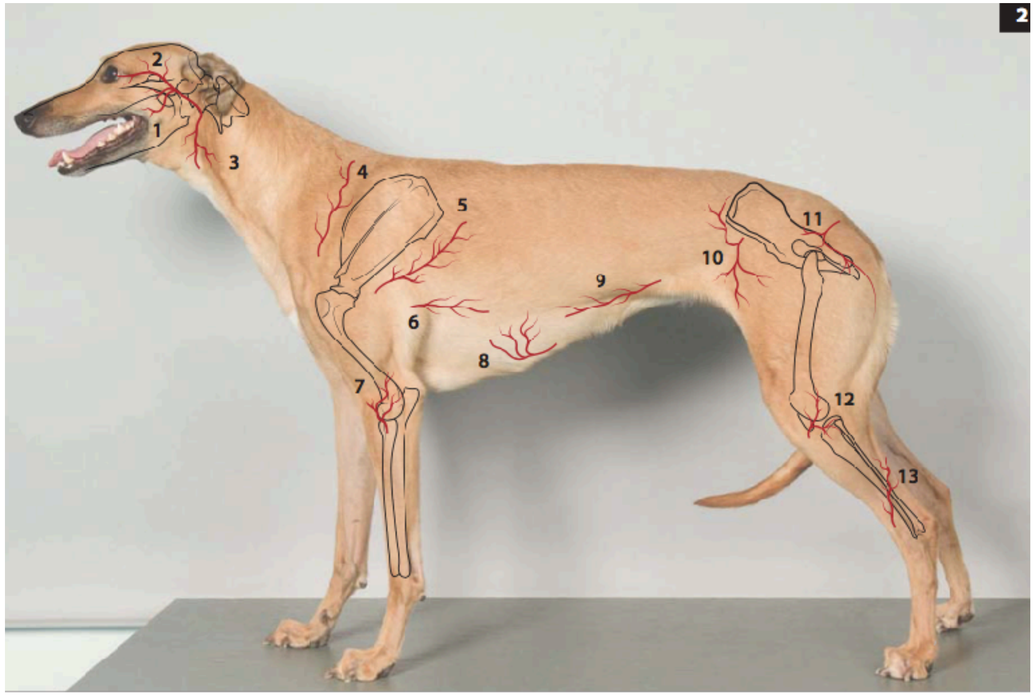
Divisions

- **Oncologic** reconstructions

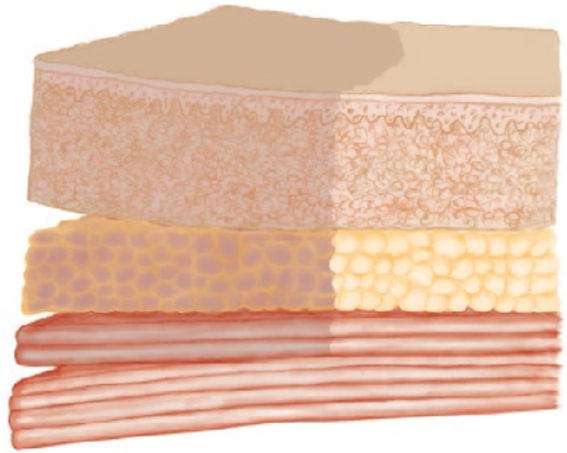
- **Traumatic** reconstructions

Categories

- Skin wounds
- Body walls
- Maxilo-facial
- Limbs
- Micro-vascular transplantations



Skin wounds reconstruction



Key points

- Debridement
- Dead space
- Drainage
- Movement
- Blood supply
- Infection
- Tension

Wound closure options

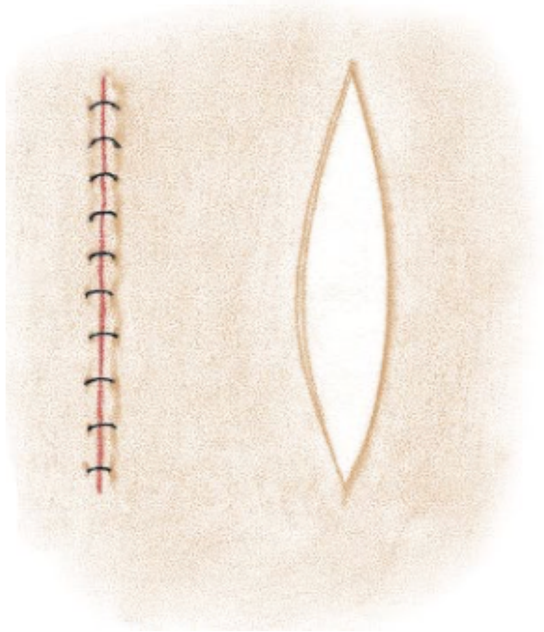
Simple closure

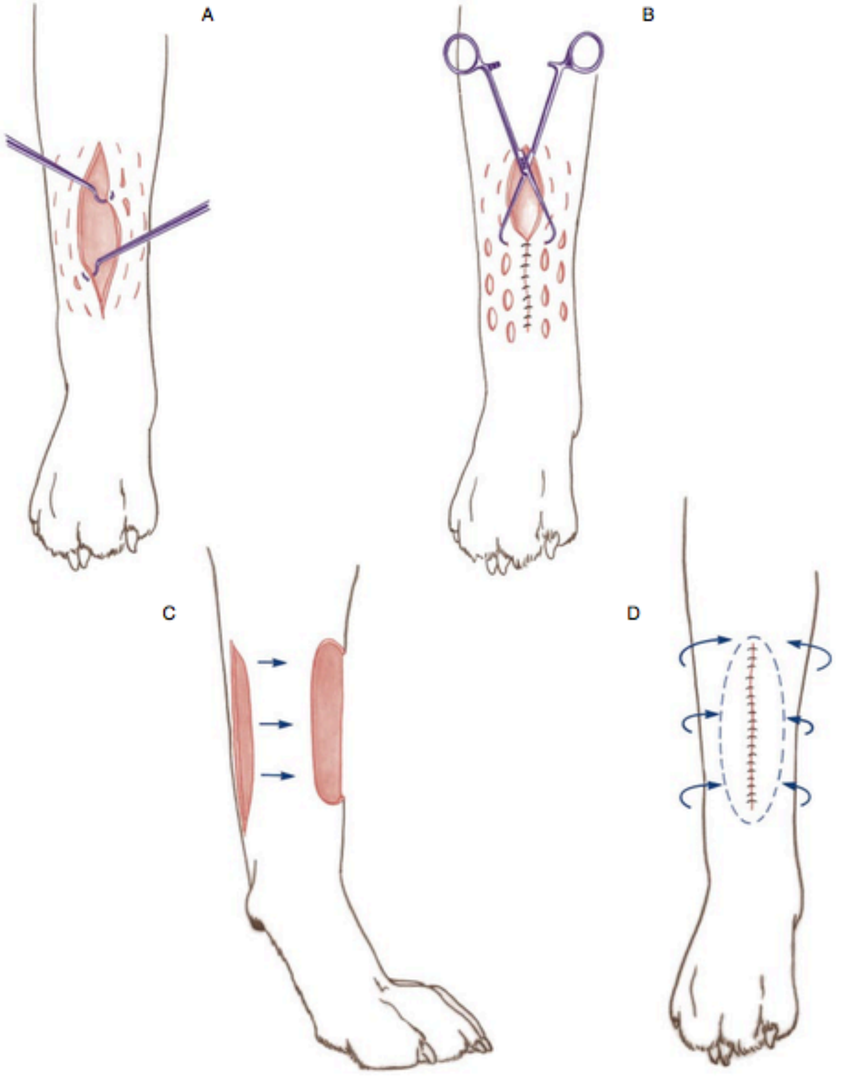
- Primary (immediate)
- Delayed primary- **before** formation of granulation tissue.
- Secondary- **after** formation of granulation tissue.

Tension relieving techniques

Tension relieving techniques

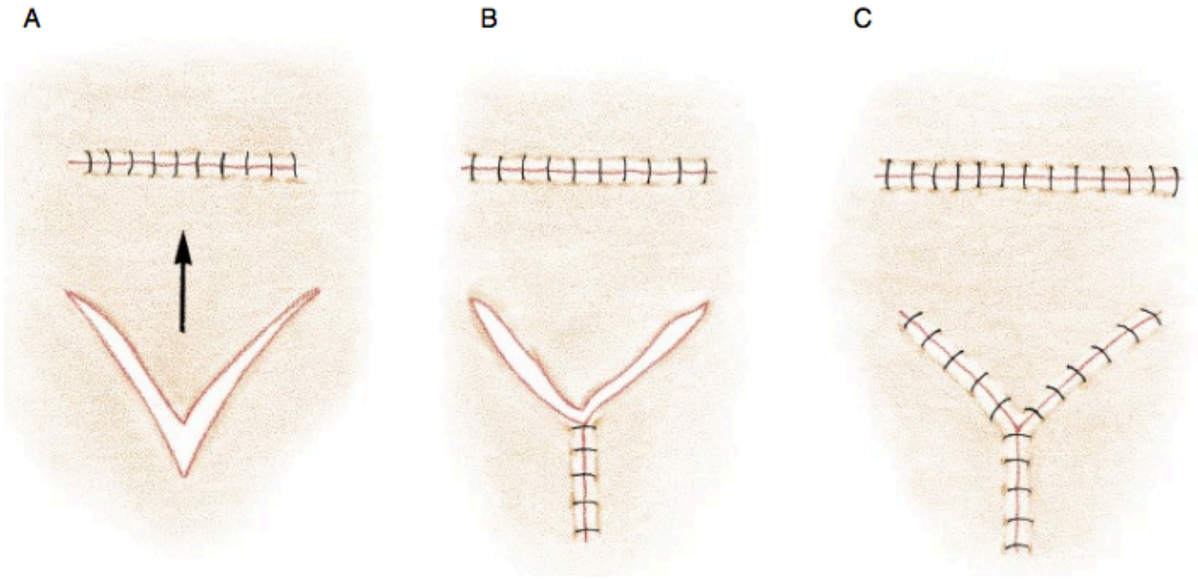
Releasing incisions



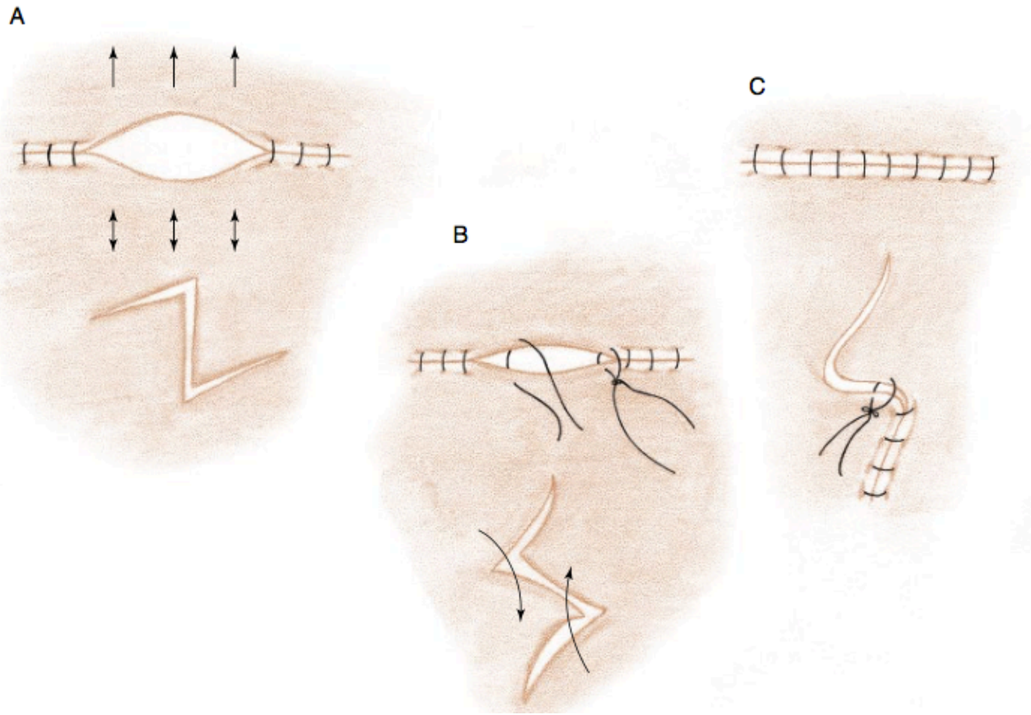


Tension relieving techniques

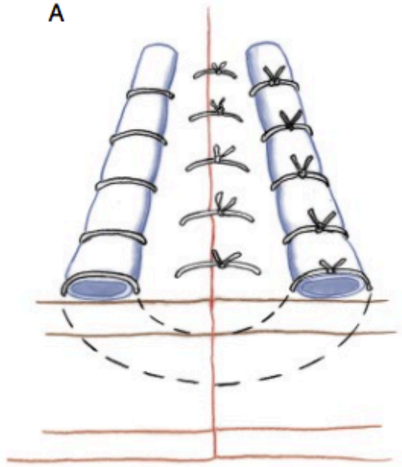
V to Y

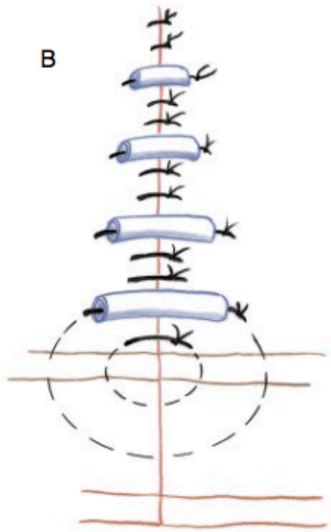


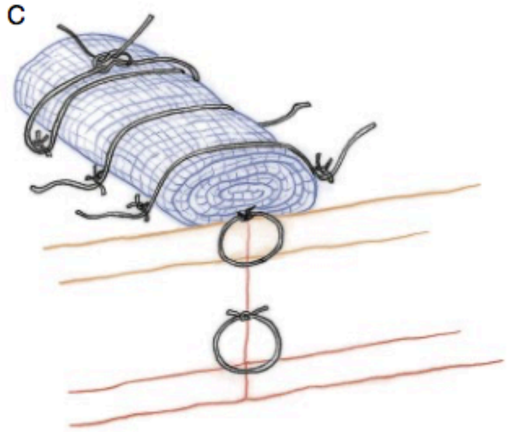
Z- plasty

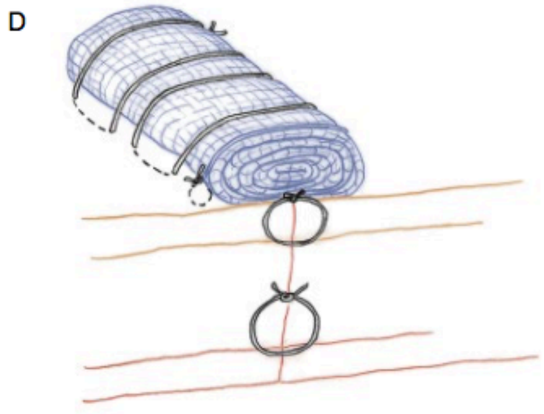


Tension relieving sutures

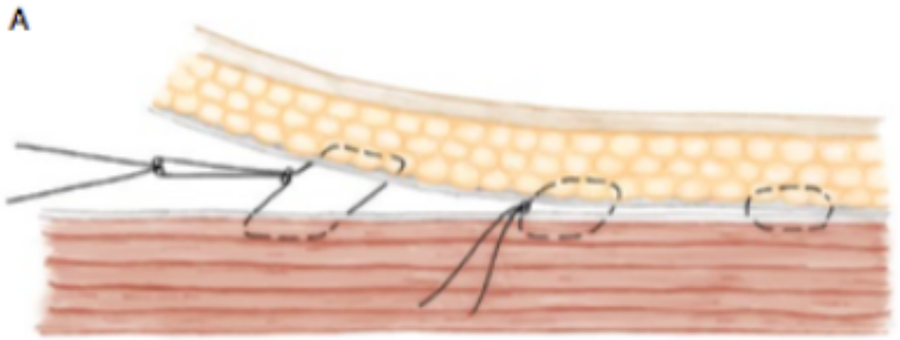


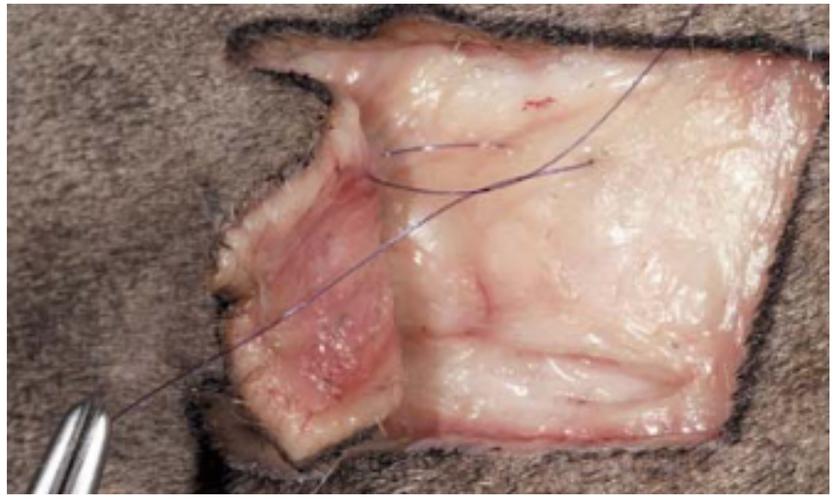


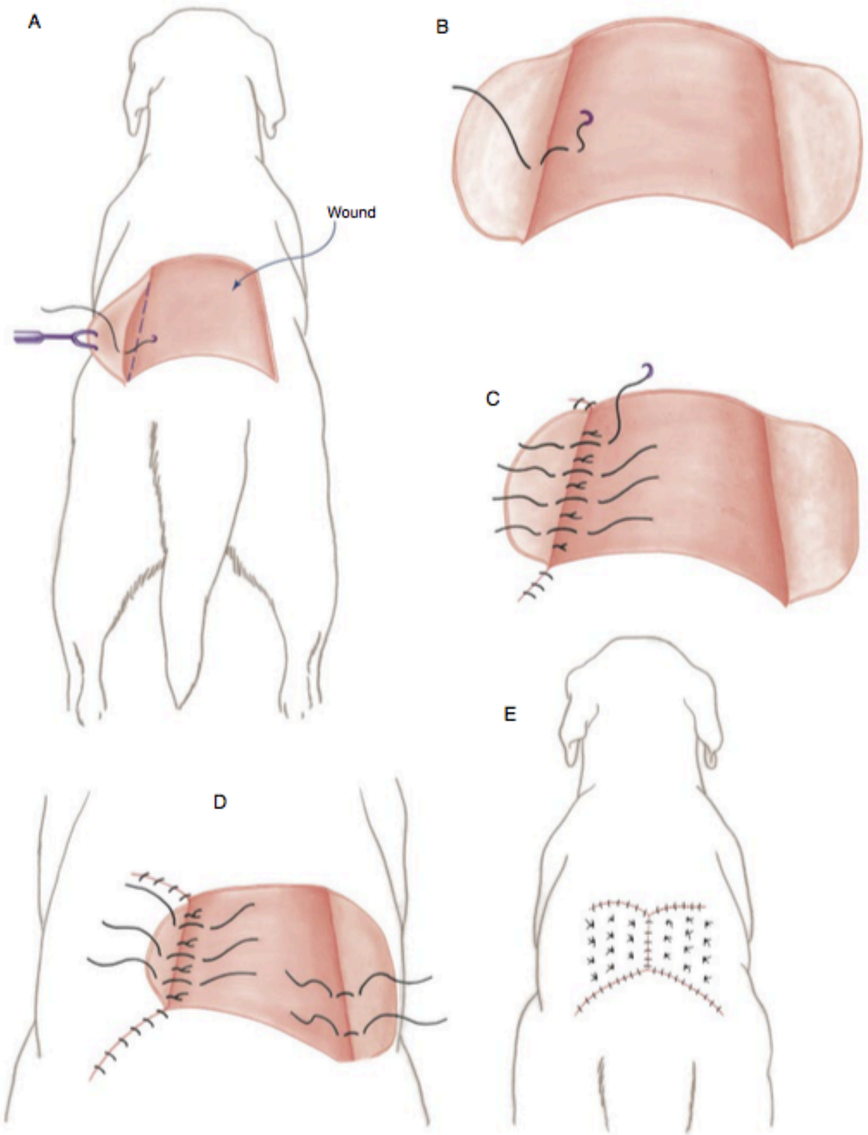




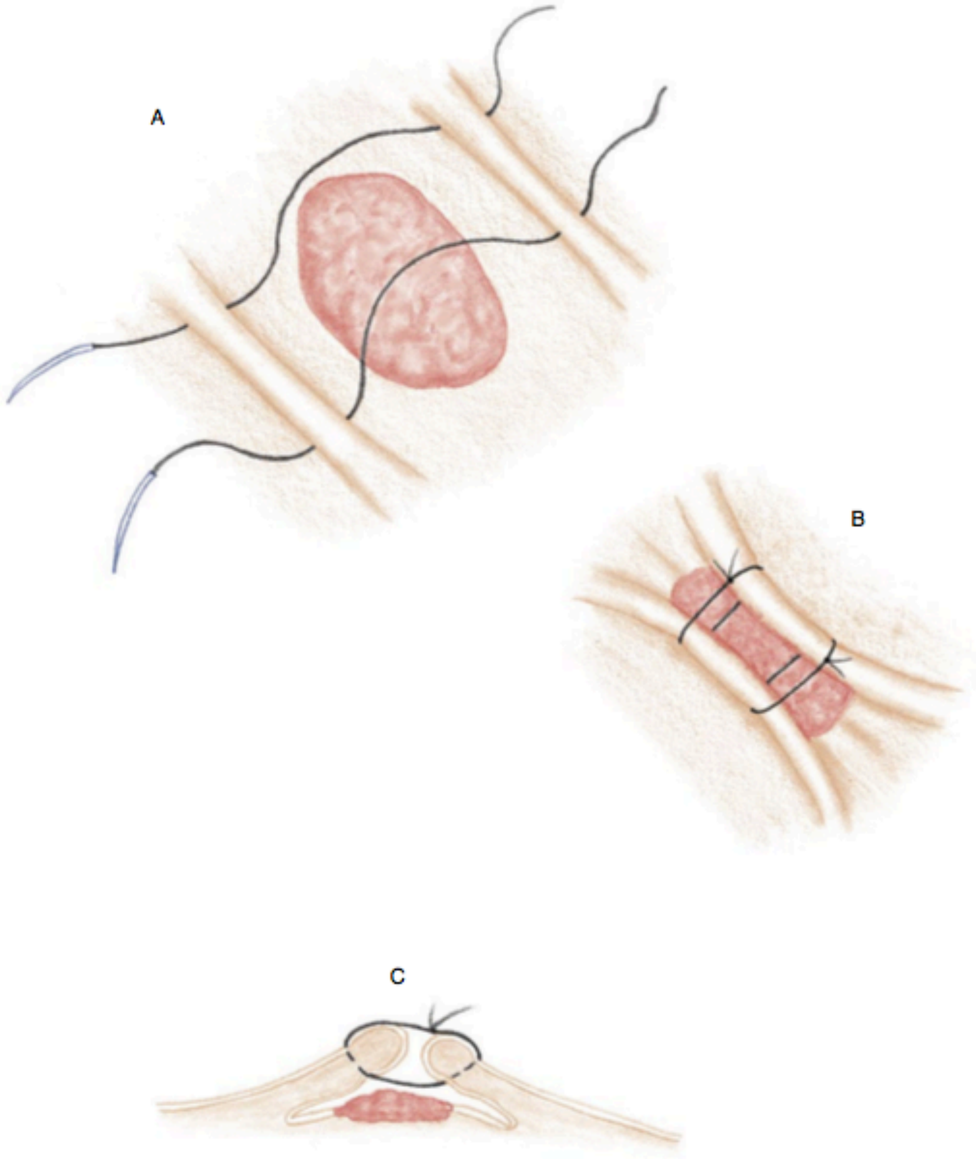
Walking sutures

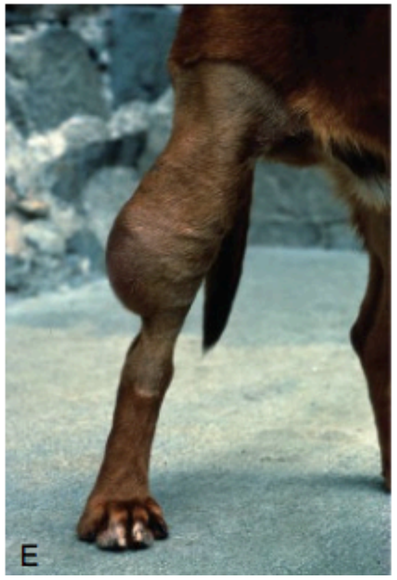






Skin expanding techniques



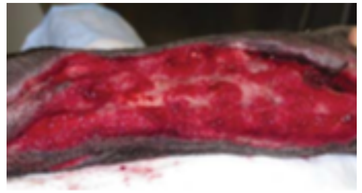


Wound closure decision making

- Location
- Age
- Type
- Severity
- Contamination

- If several techniques have <u>equal chances</u> => **<u>the simplest.</u>**

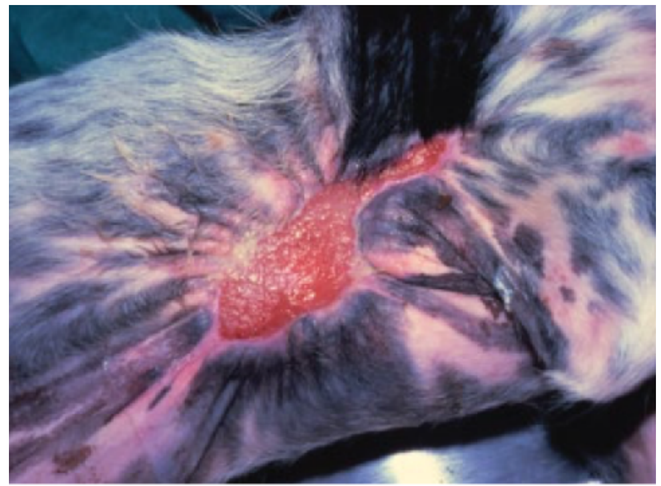
Wound closure decision making



- **Second intention healing**

-Extensive bandaging and follow-up.
-May eventually more costly.
-Often- poor quality epithelium, cicatrix contractures.

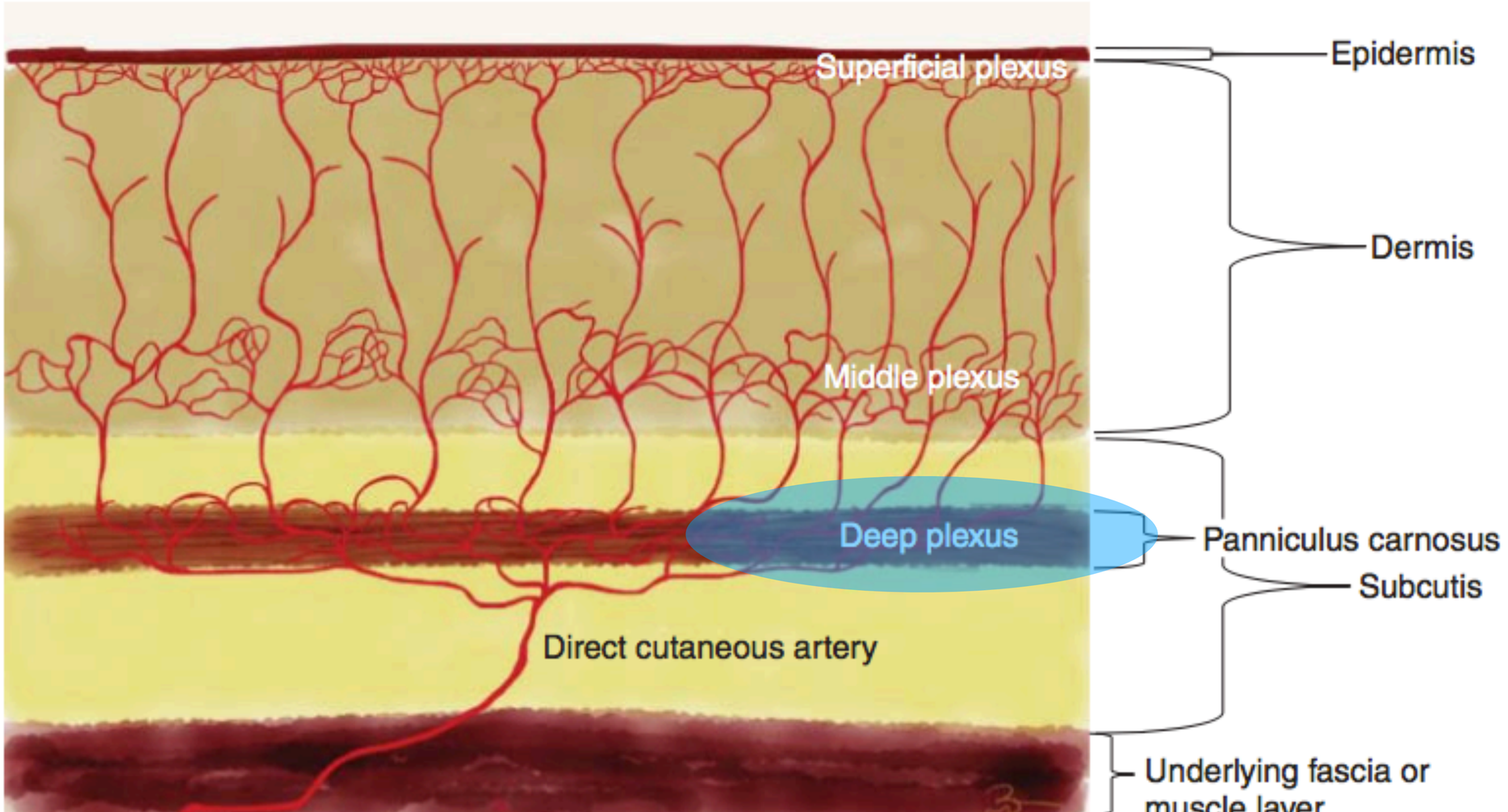
- **Skin flaps and grafts** can be used to avoid these drawbacks.



Skin flaps

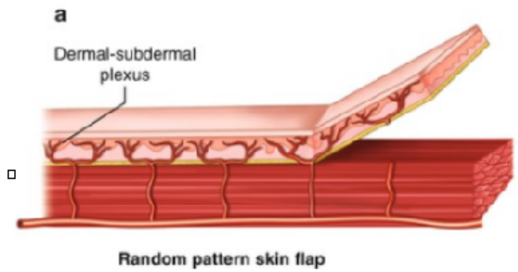
Vascular anatomy of the skin

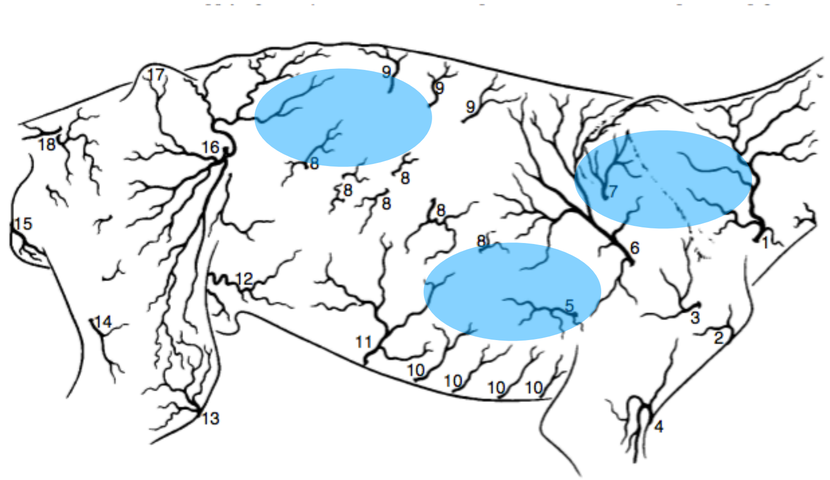
- The **deep subdermal** plexus- most important to preserve.



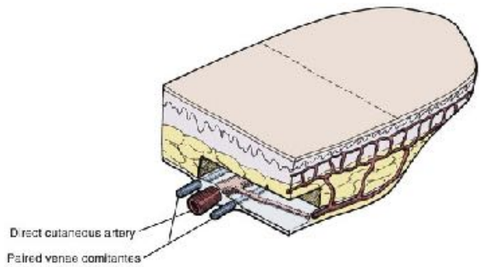
Skin flaps

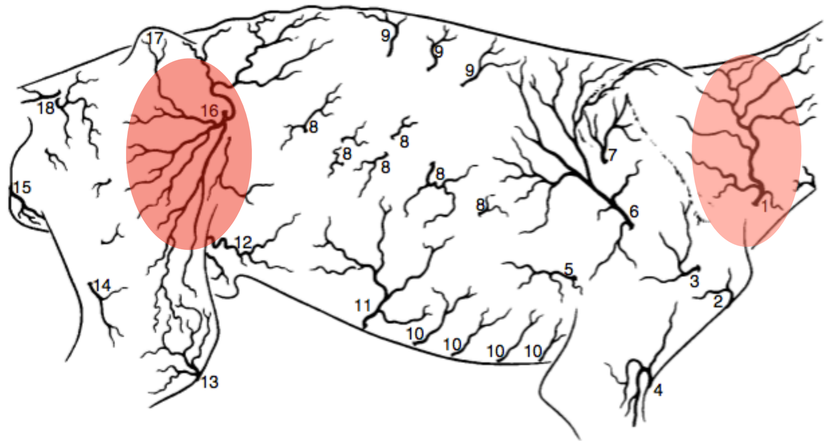
Subdermal (Random)- rely on the subdermal vascular plexus.





Axial- rely on a direct large cutaneous artery.

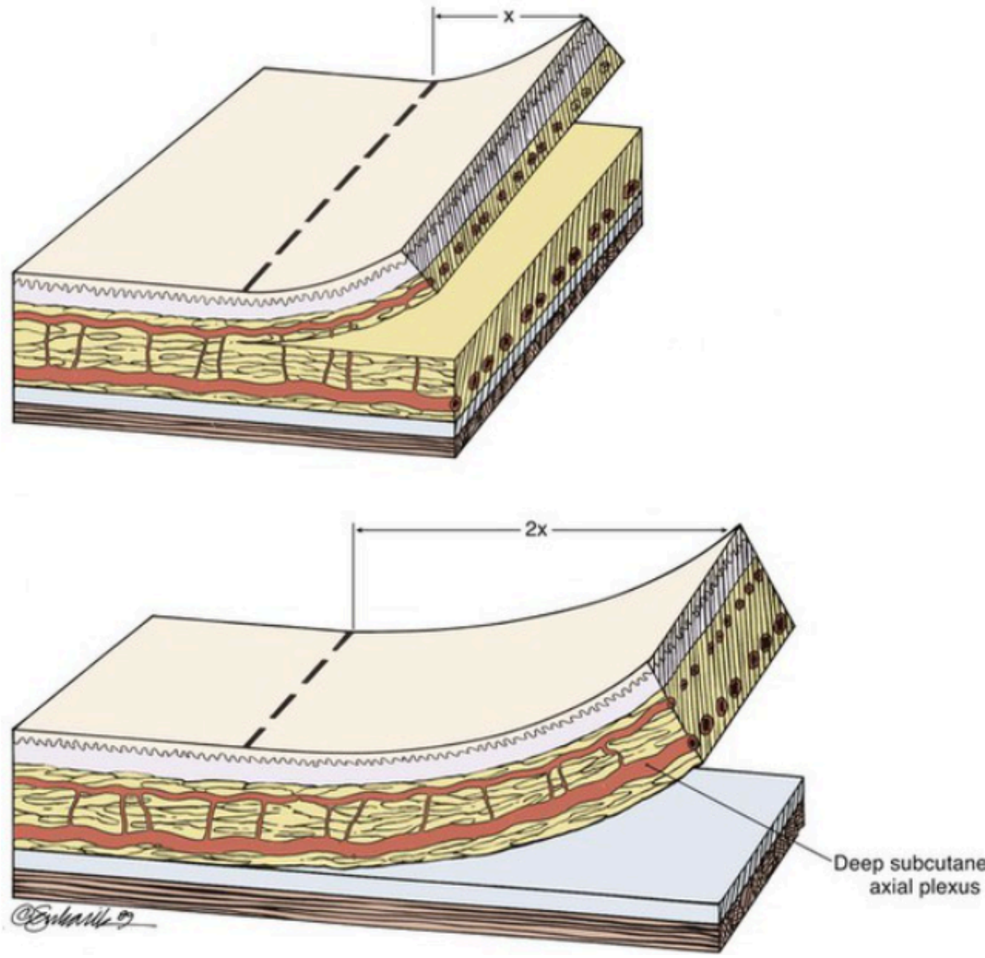




Skin flaps

Subdermal (Random) flaps

- Any location and direction.
- Limited length- 1.5 to 2 times longer than they are wide.



Subdermal flaps

Can either be local or distant.

- **Local flaps:**

-advancement

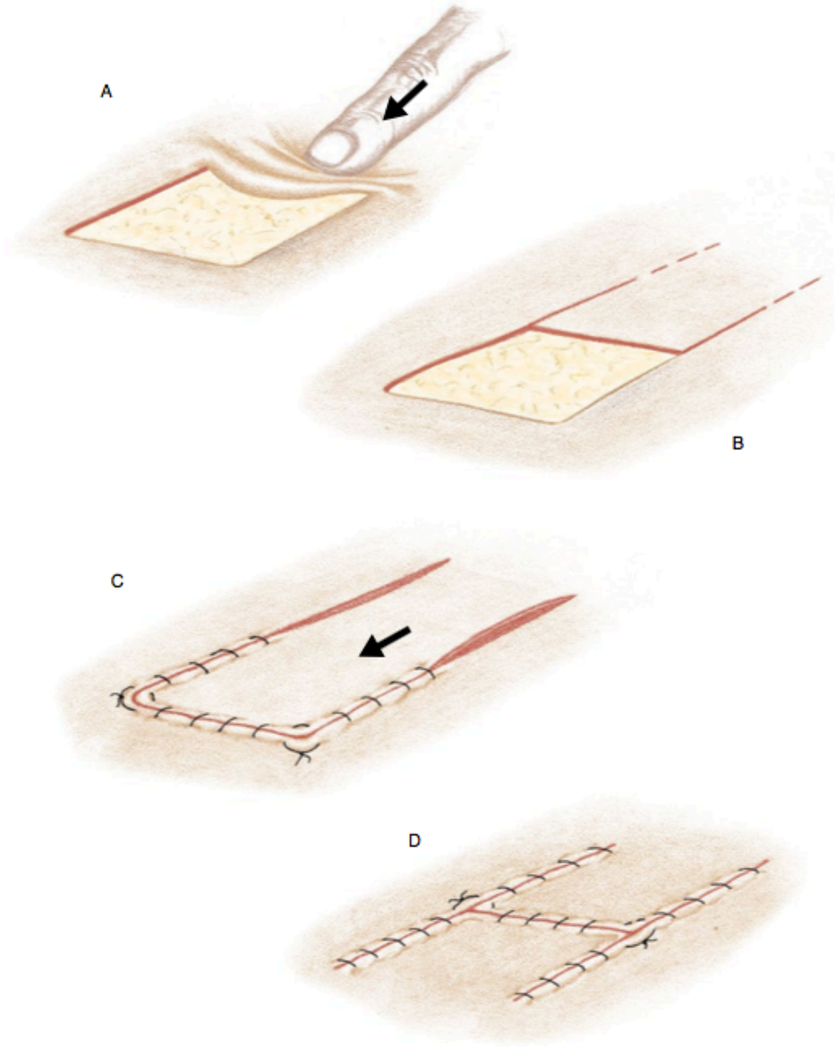
-rotation

-transposition

-interpolation flaps

- **Distant flaps:**

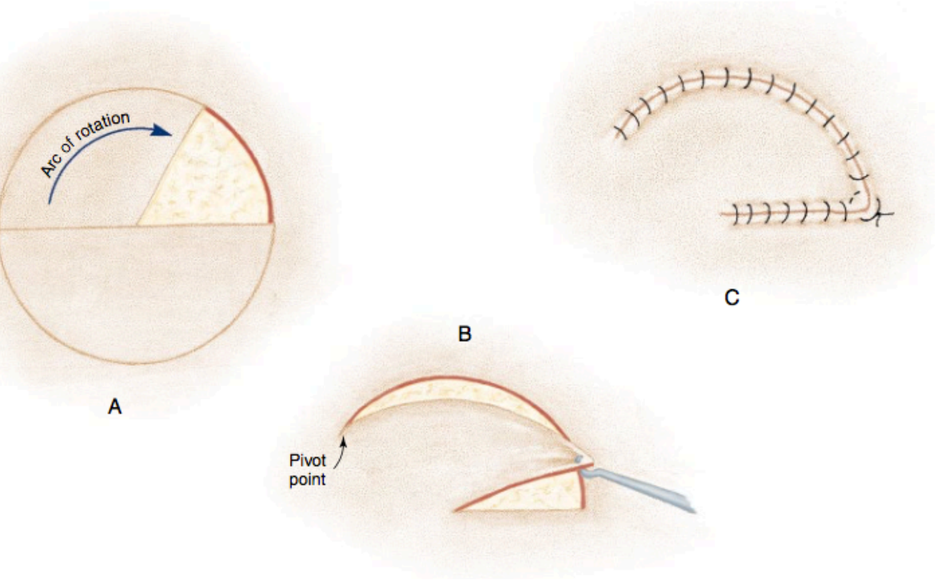
-hinge and pouch flaps



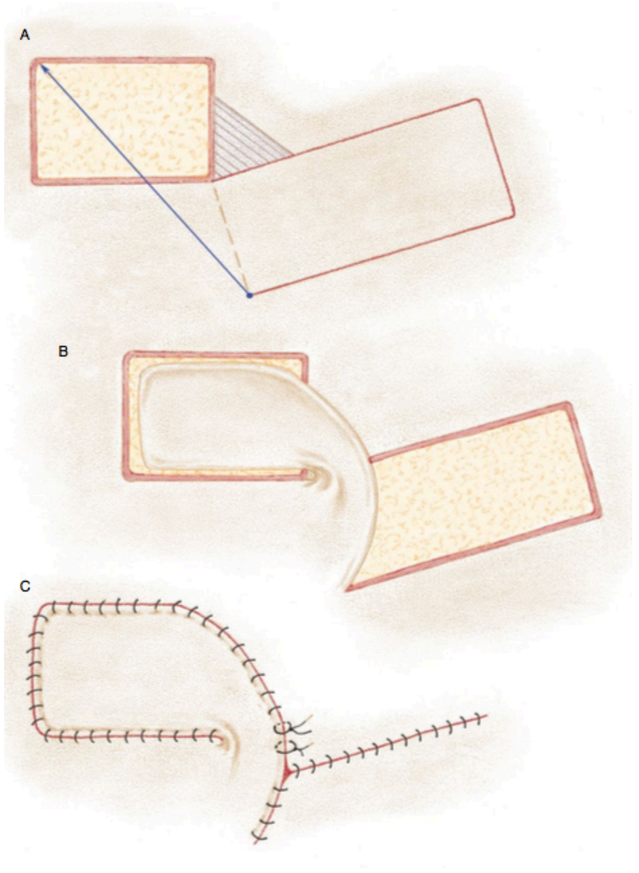
Local advancement flap

Local flaps

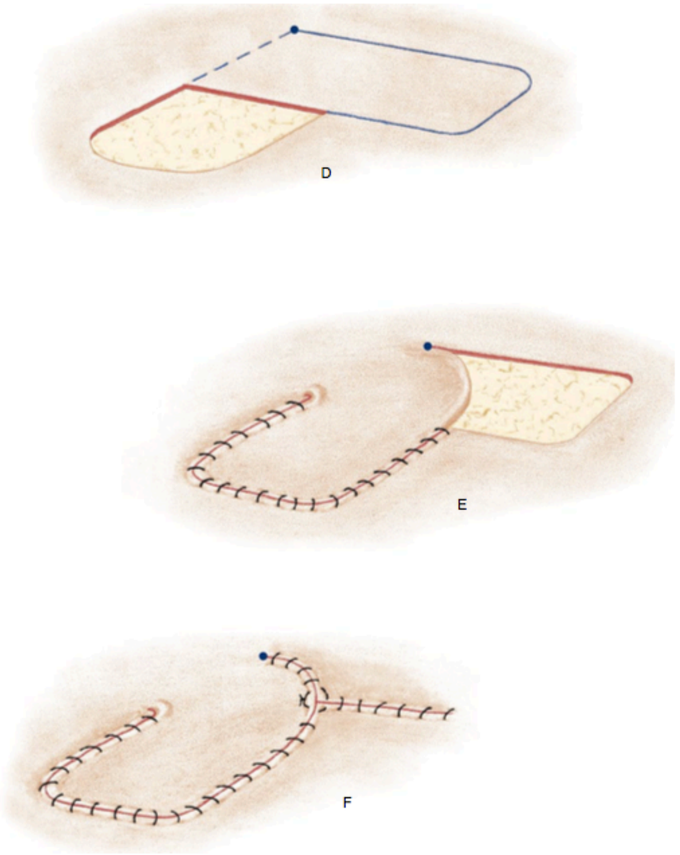
Rotational flap



Transposition flap- oblique

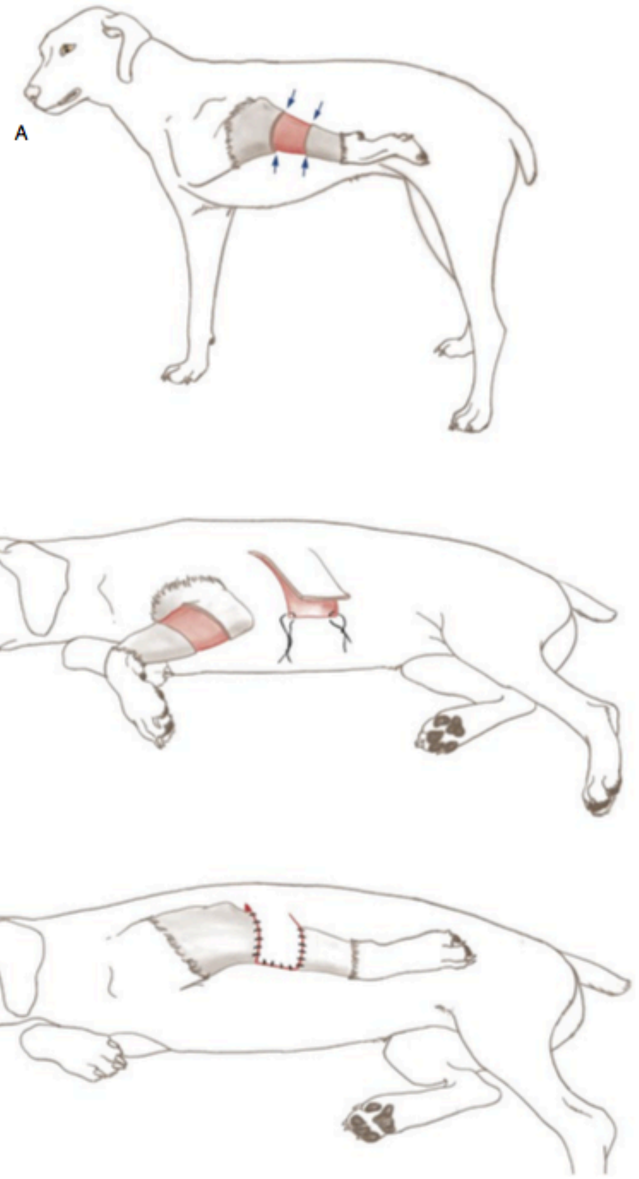


Transposition flap 90 degrees



Distant flaps

- **Pouch flap**



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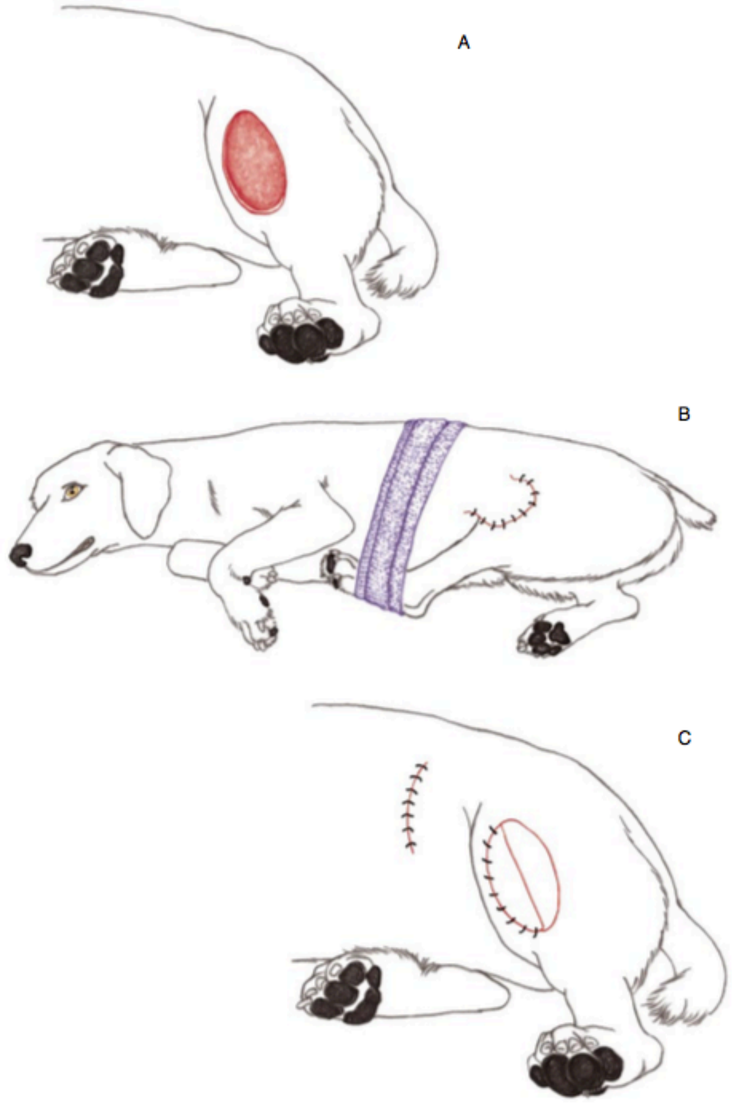
Distant flaps

- **Hinge flap**



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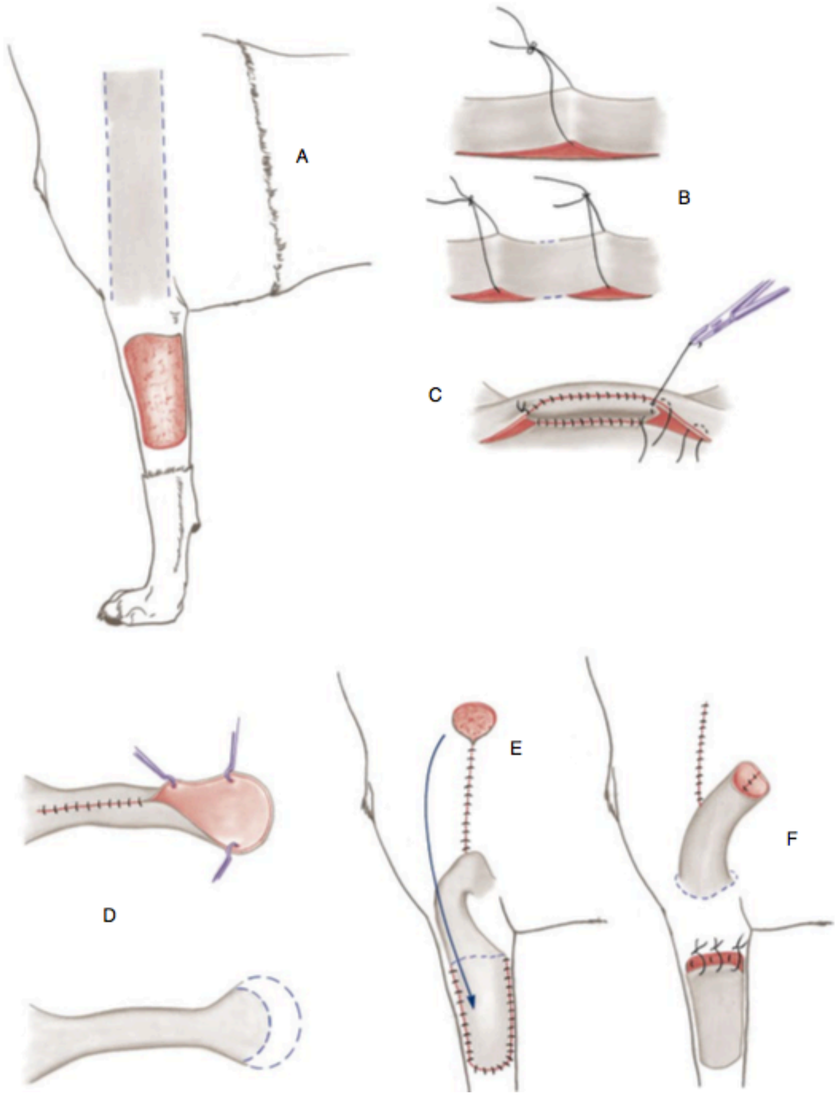
Distant flaps

- **Tube flap**



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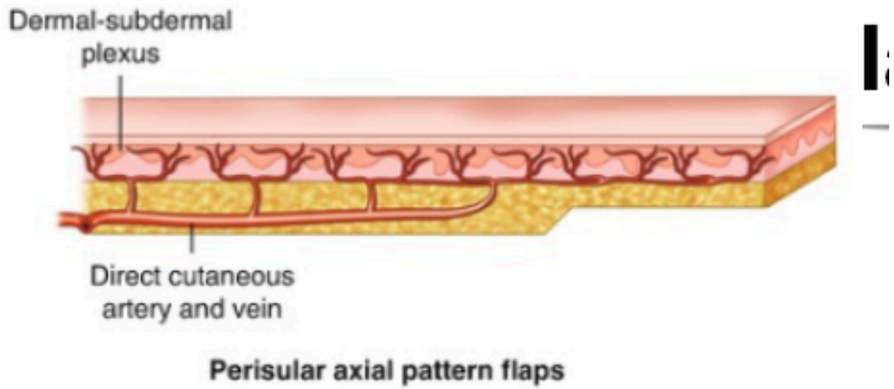
Axial pattern flaps

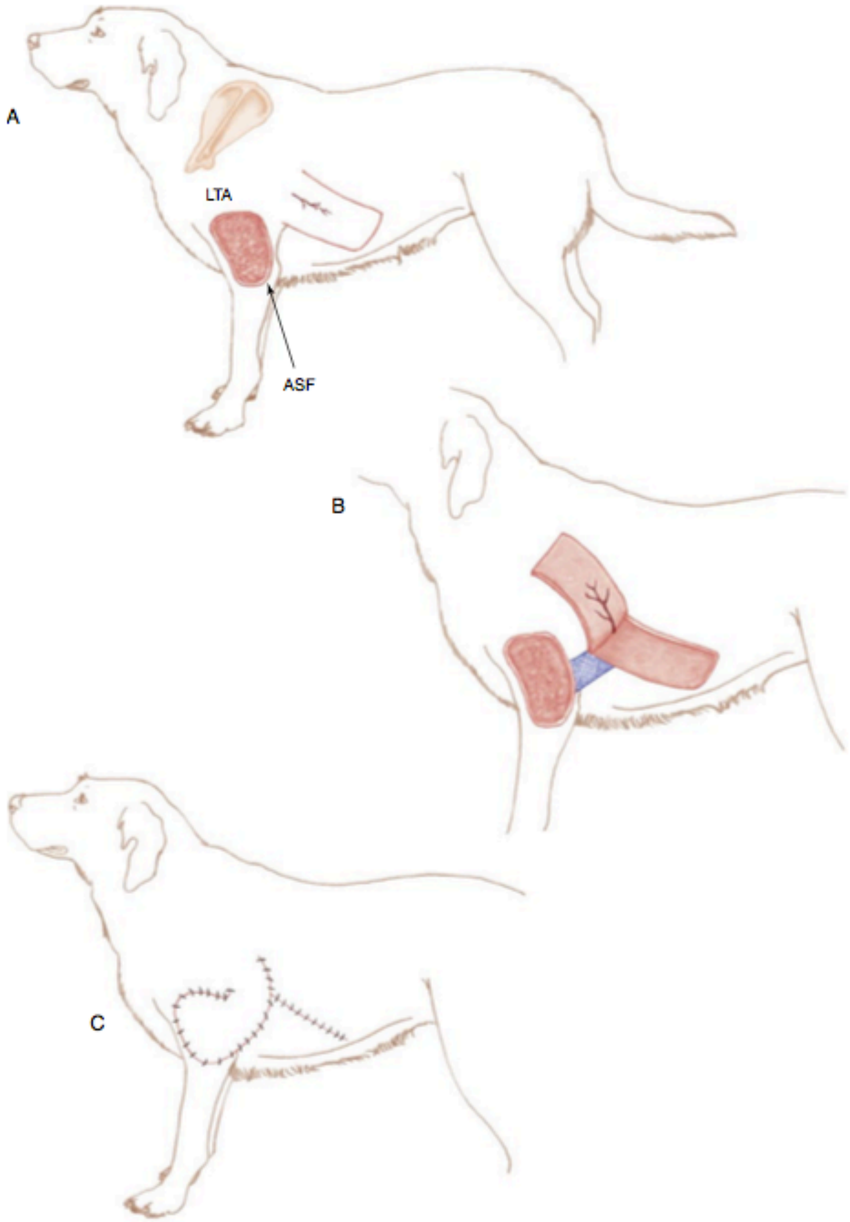
- **<u>Angiosome</u>**- area of skin vascularised by a major cutaneous artery, after which it is named.

- <u>More robust and **survive on greater lengths.**</u>

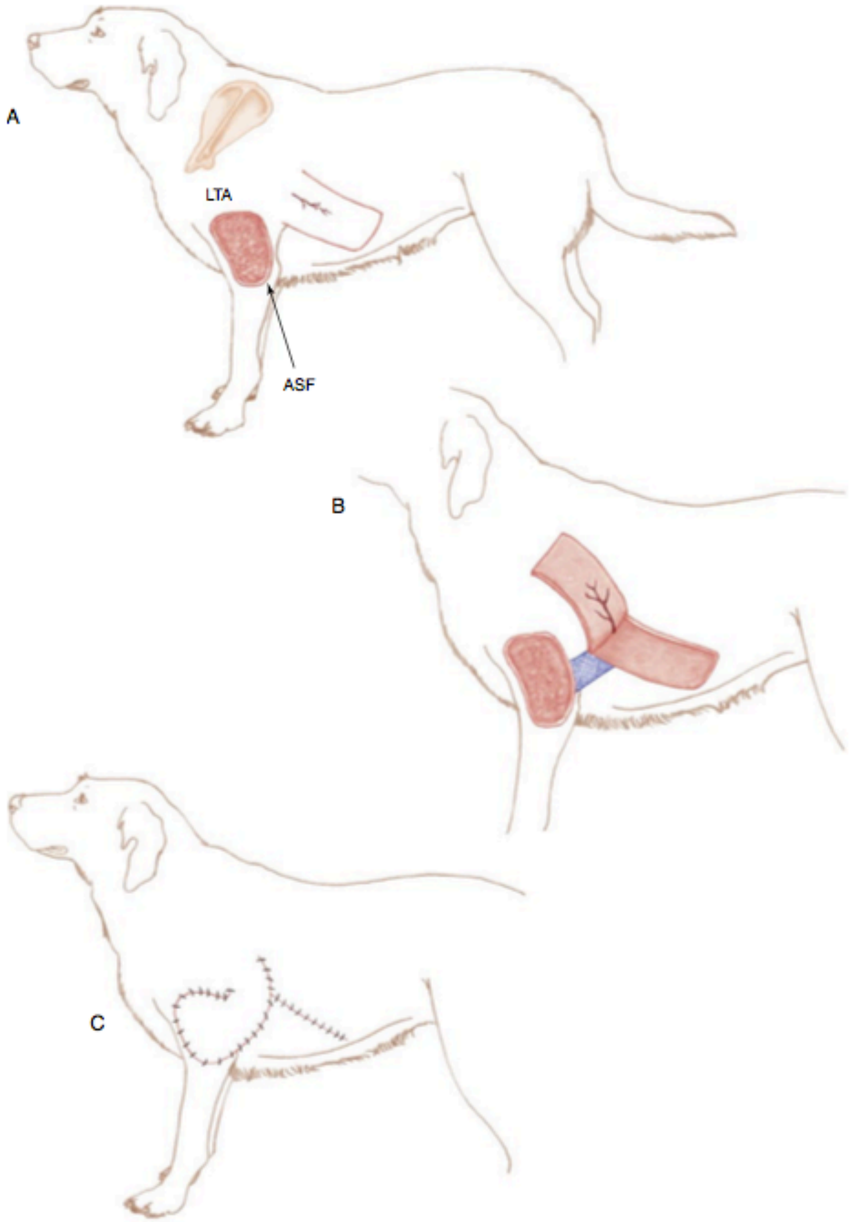


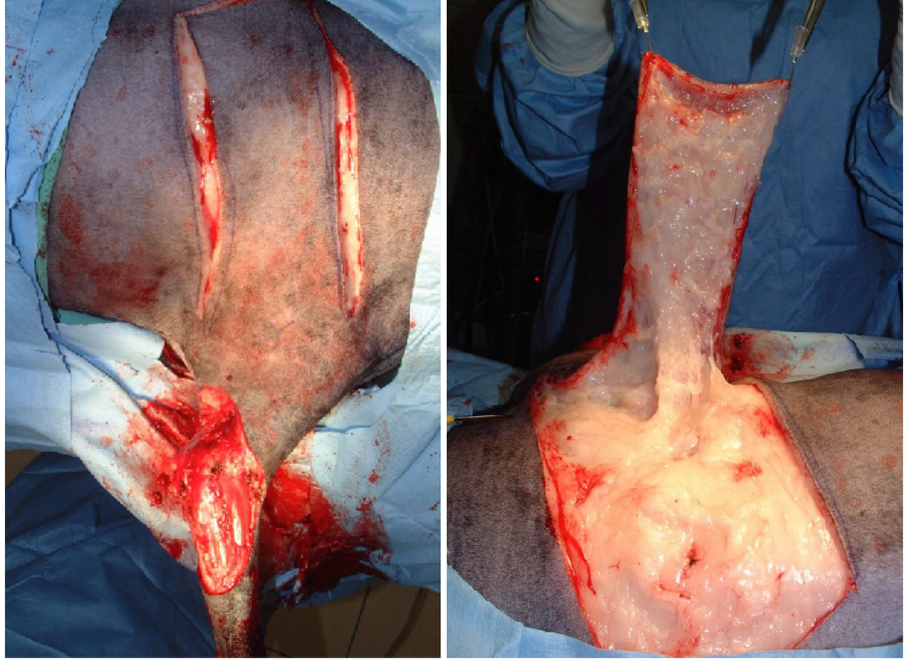
Perisular axial pattern flaps

Lateral Thoracic Axial Pattern Flap

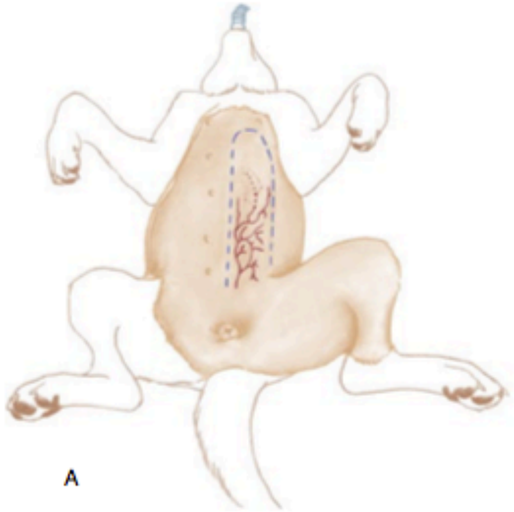


Lateral Thoracic Axial Pattern Flap





Caudal Superficial Epigastric Flap



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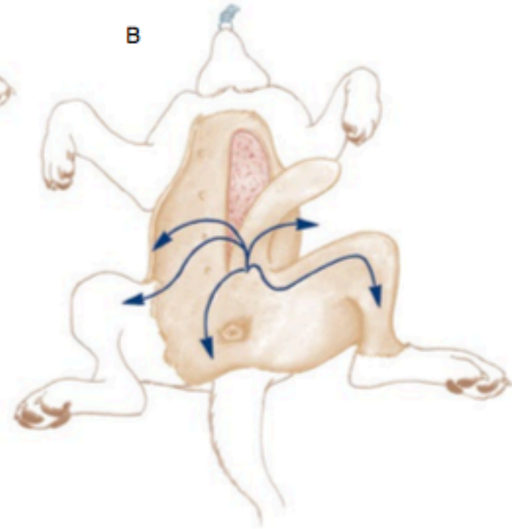

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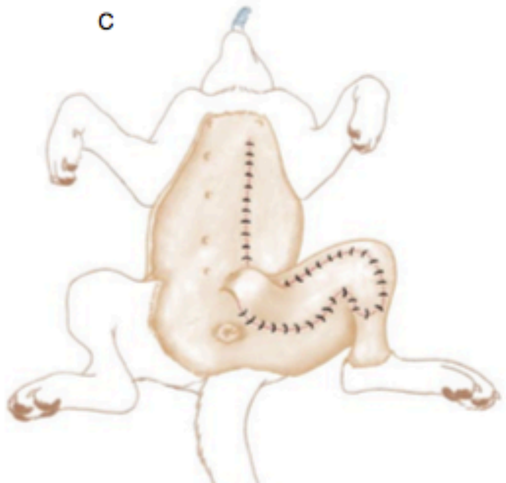

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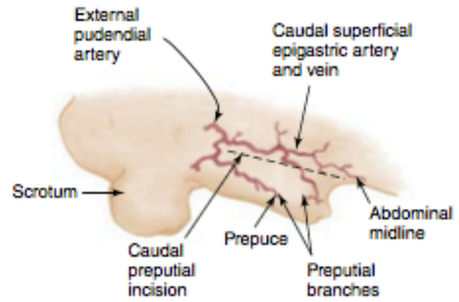
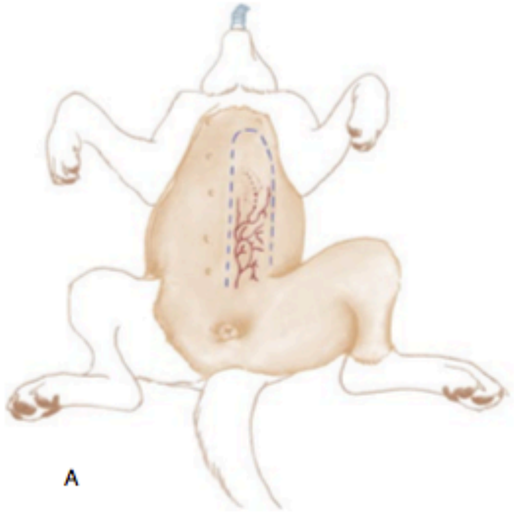


Caudal Superficial Epigastric Flap



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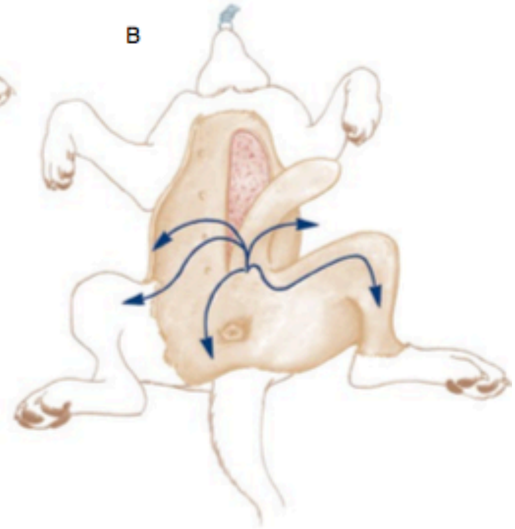

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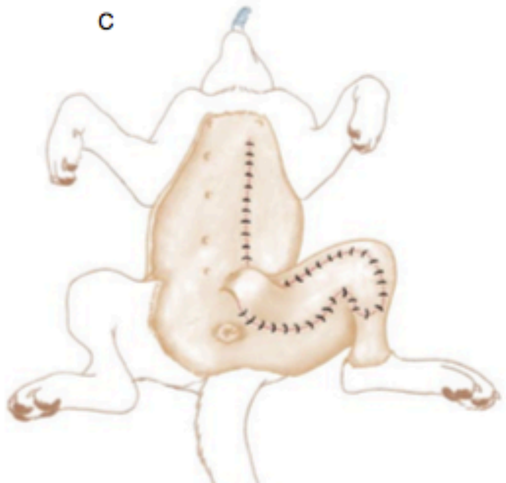

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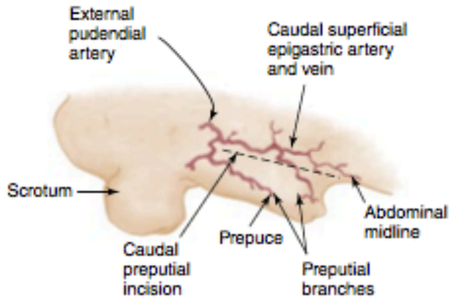

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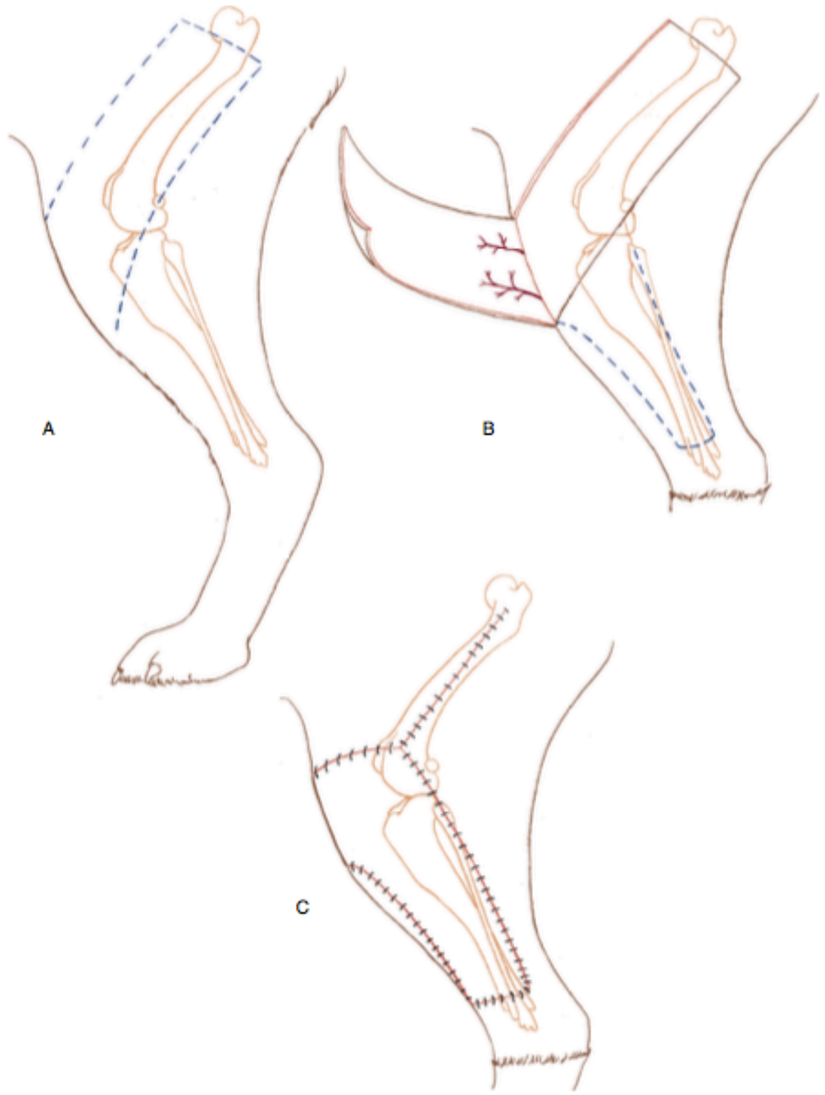
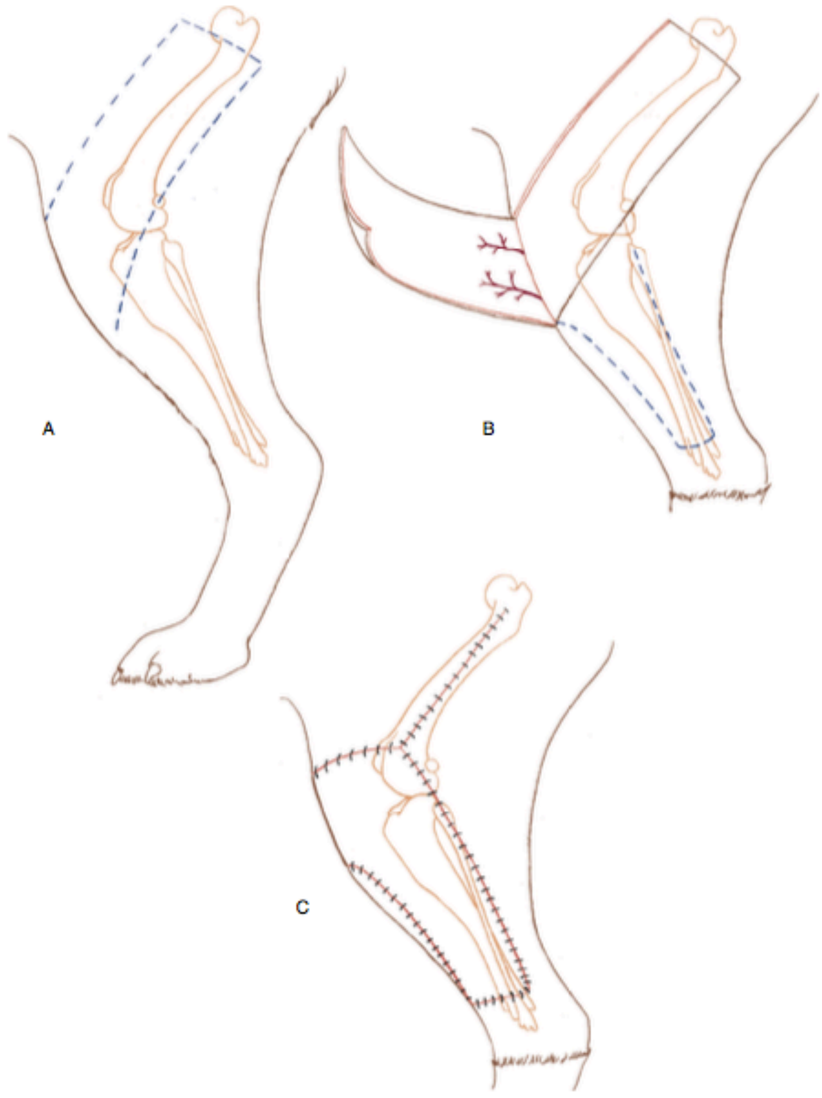
Genicular Axial Pattern Flap

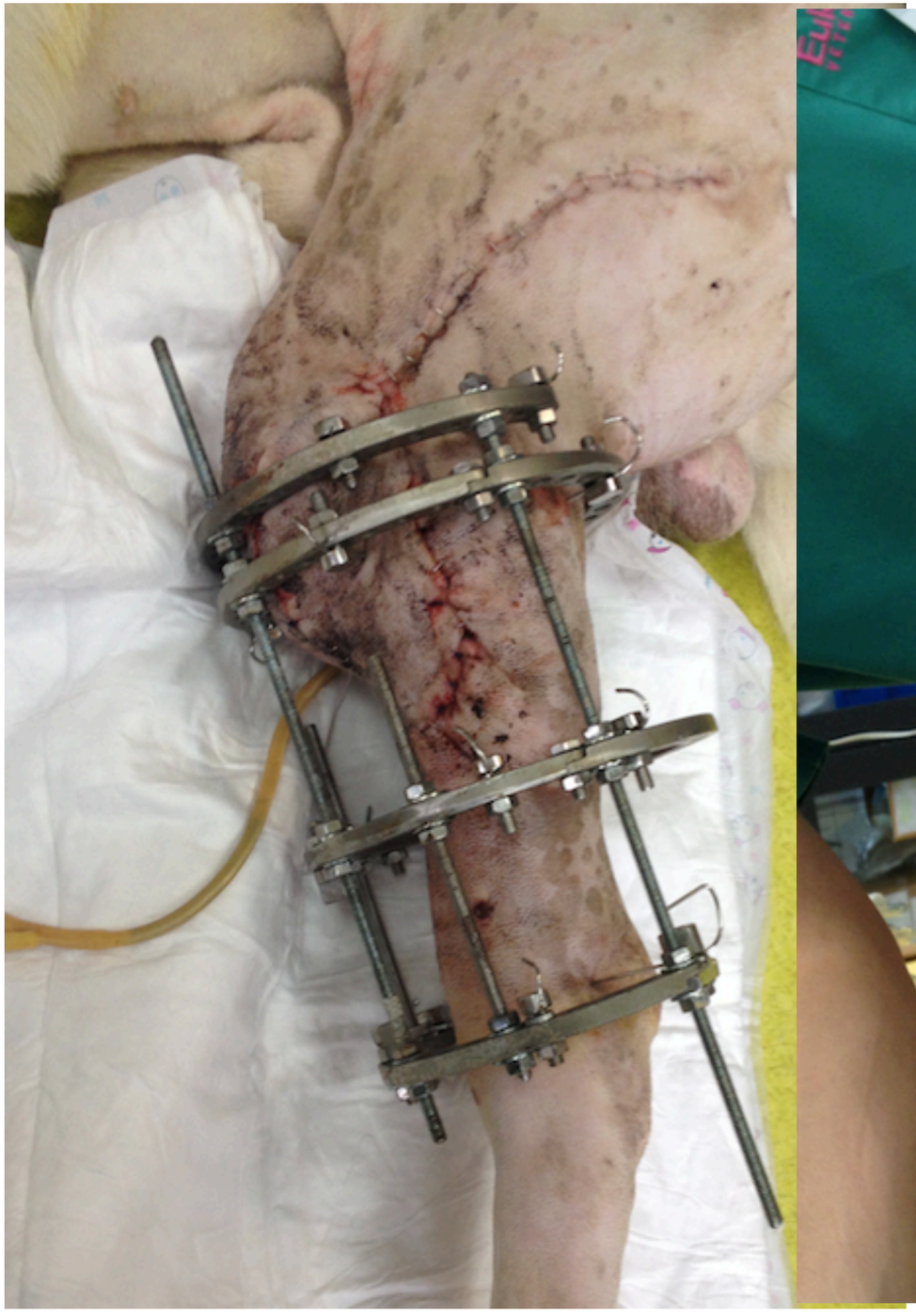


Genicular Axial Pattern Flap

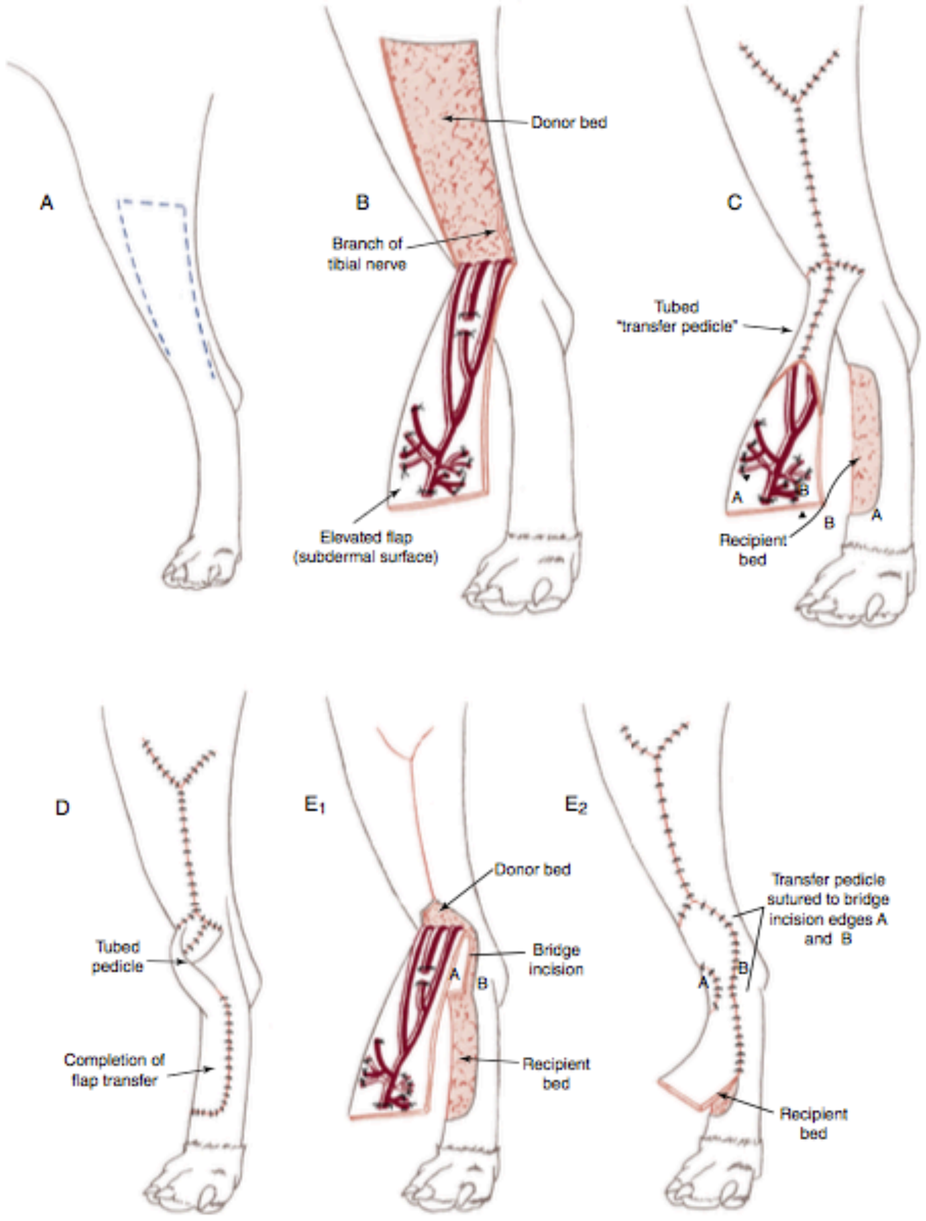


9 y old, pit bull, fibrosarcoma removal

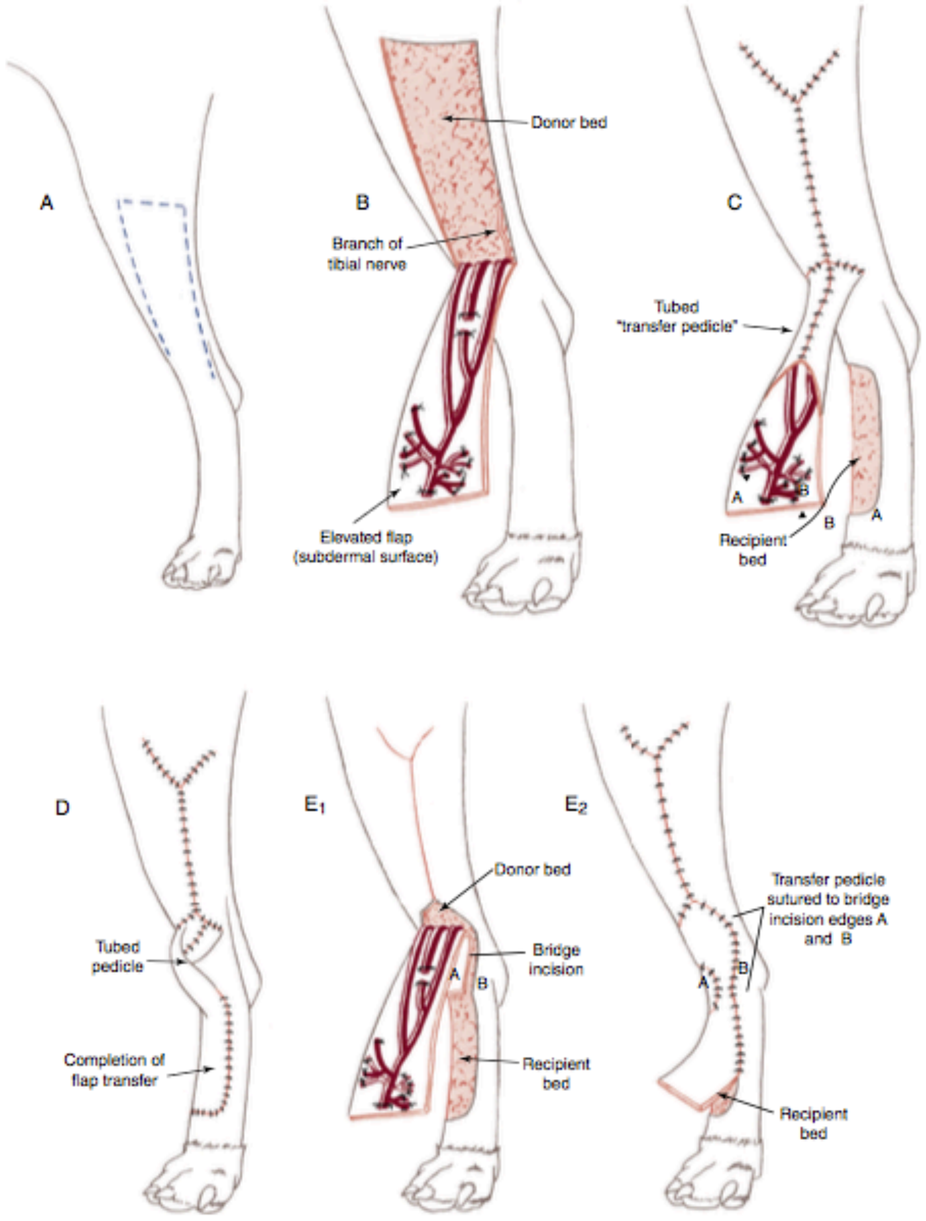
Genicular Axial Pattern Flap



Reverse Saphenous Conduit Flap



Reverse Saphenous Conduit Flap



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Case 1

Djanet

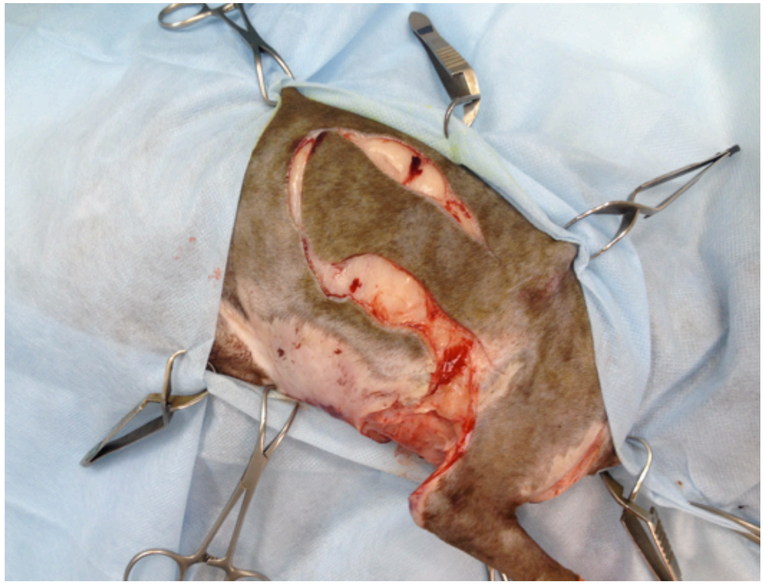
10 m old, female pincher

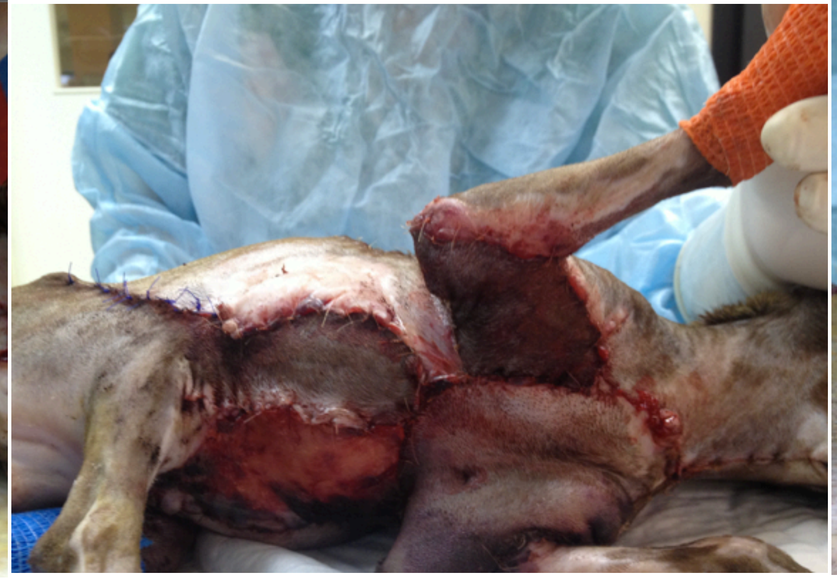
Severe burn injury- ventral skin area

Conservative treatment for 3 months

UNABLE TO WALK

4 advancement flaps surgeries



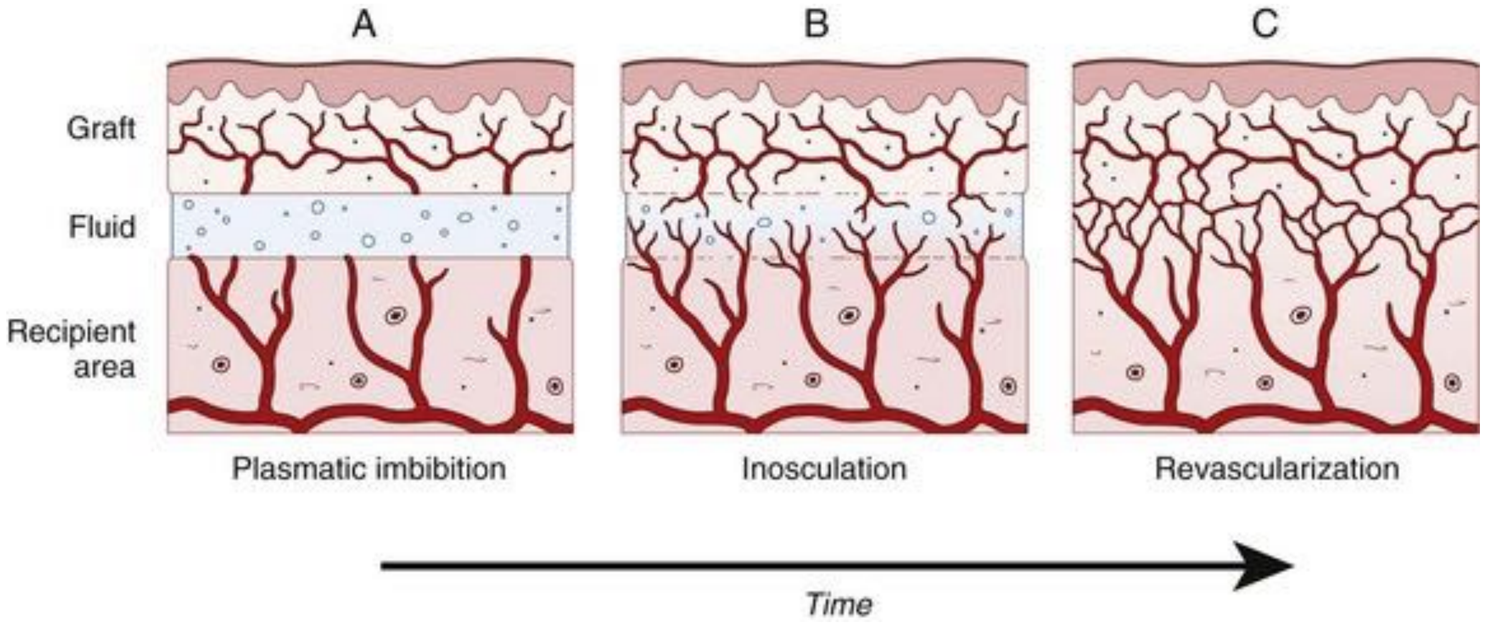


80 days f up

110 days f up

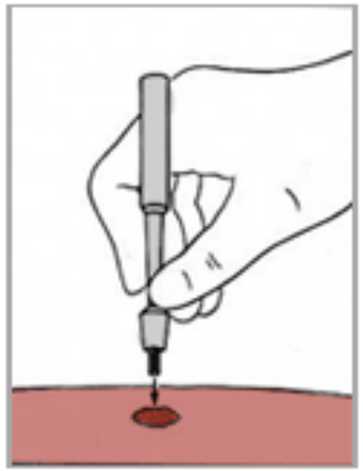
Skin grafts

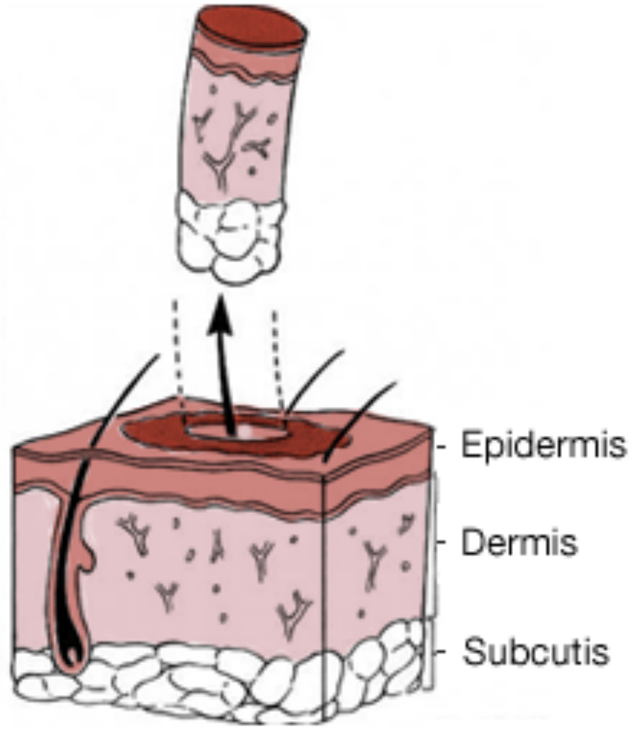
- Partial-thickness or full-thickness.
- No vascularization!
- The receiving bed must be **<u>healthy and well-vascularised.</u>**



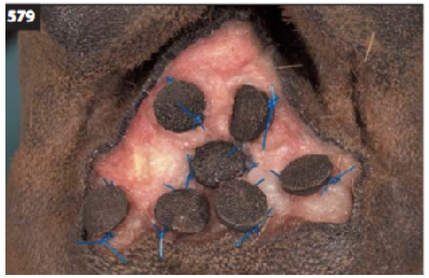
Pinch and punch grafts

- Easy to perform
- Very good drainage
- Cosmetic aspect is rather poor.



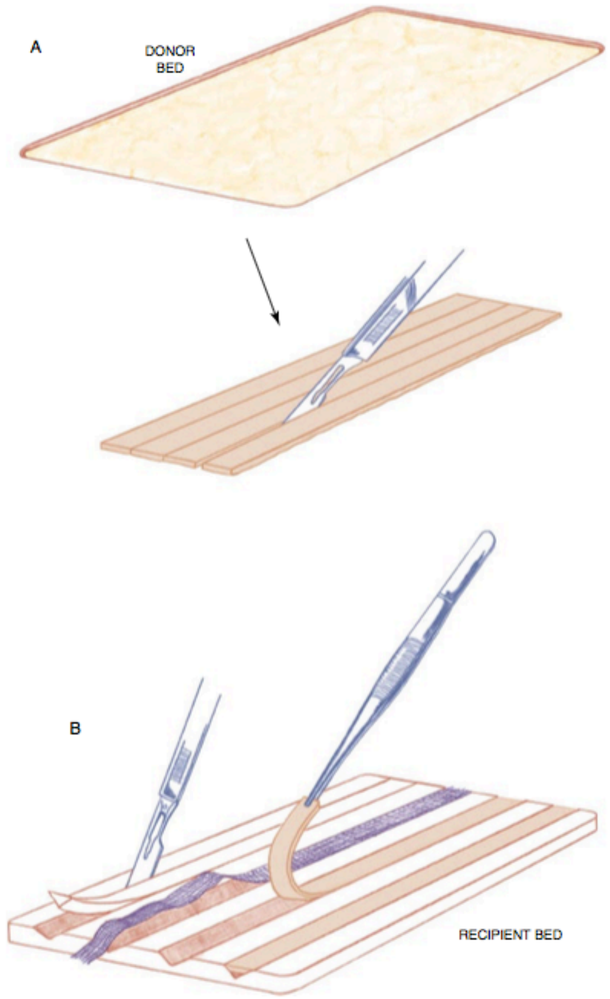


577, 578 Sutures are preplaced in the graft (577) before the



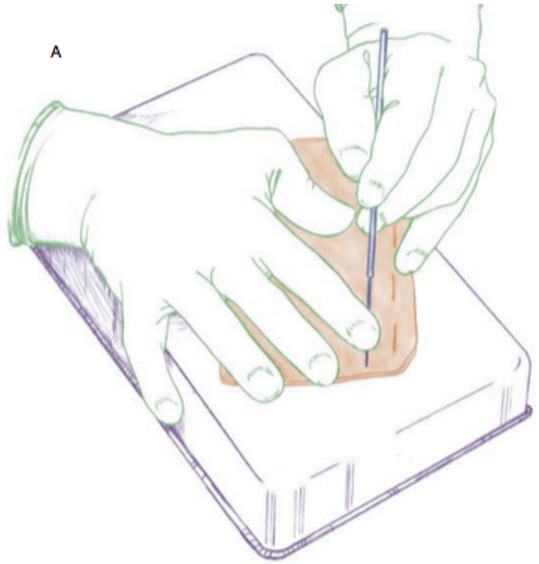
Strip grafts

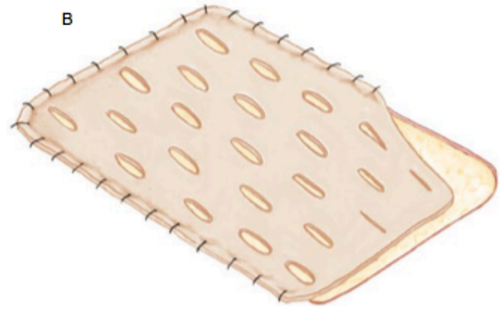
Good drainage, poor cosmetic results.

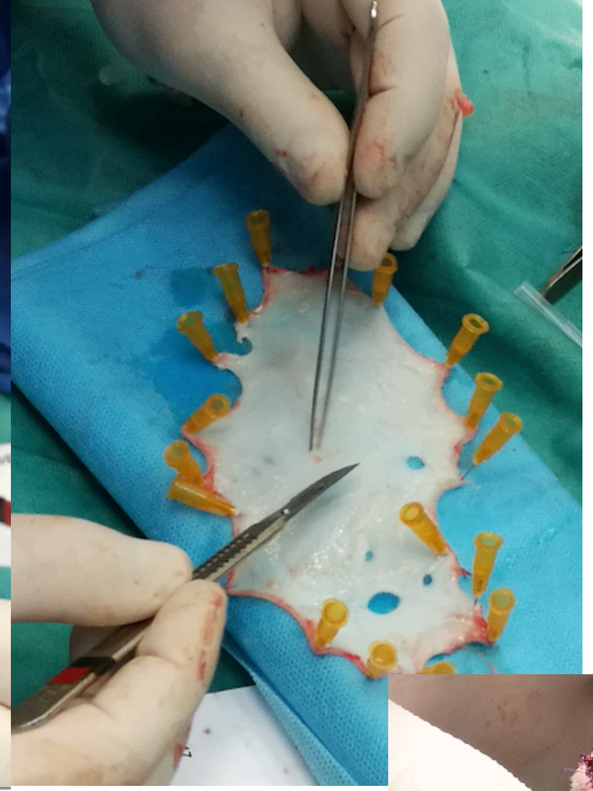


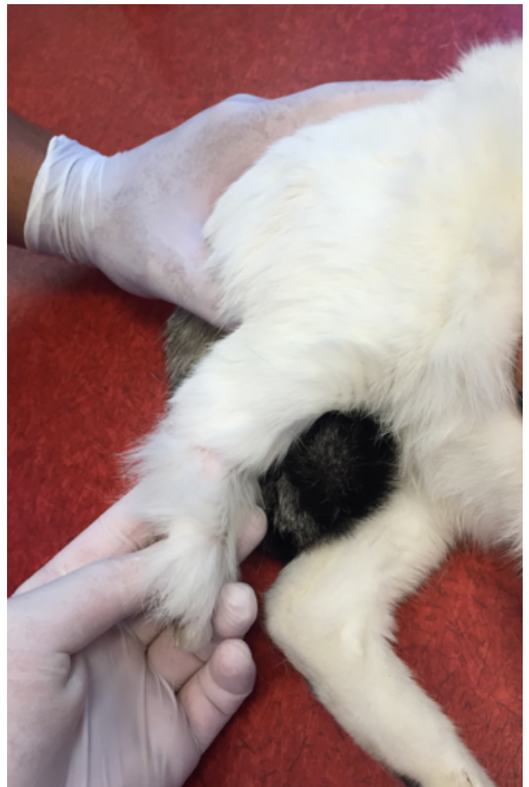
Mesh grafts

- Time consuming
- Reasonable drainage
- Faster healing
- Good cosmetic appearance









Degloving injury

10 y old boxer, bleeding hamengiopericitoma

Primary closure

ESF breakage, dehiscence

Mesh grafting

Chronic wounds

Chronic wounds- **prolonged inflammation** =>lengthy healing process.

- **Fibrosis**
- **Destructive proteinases**
- **Bacterial biofilms**

Exposed bones

- Common with **<u>shearing</u>** and avulsion injuries (mostly Mt and Mc).
- Healing by “creeping coverage” from **<u>granulation tissue</u>**
- Exposed **necrotic** bone- removal ?

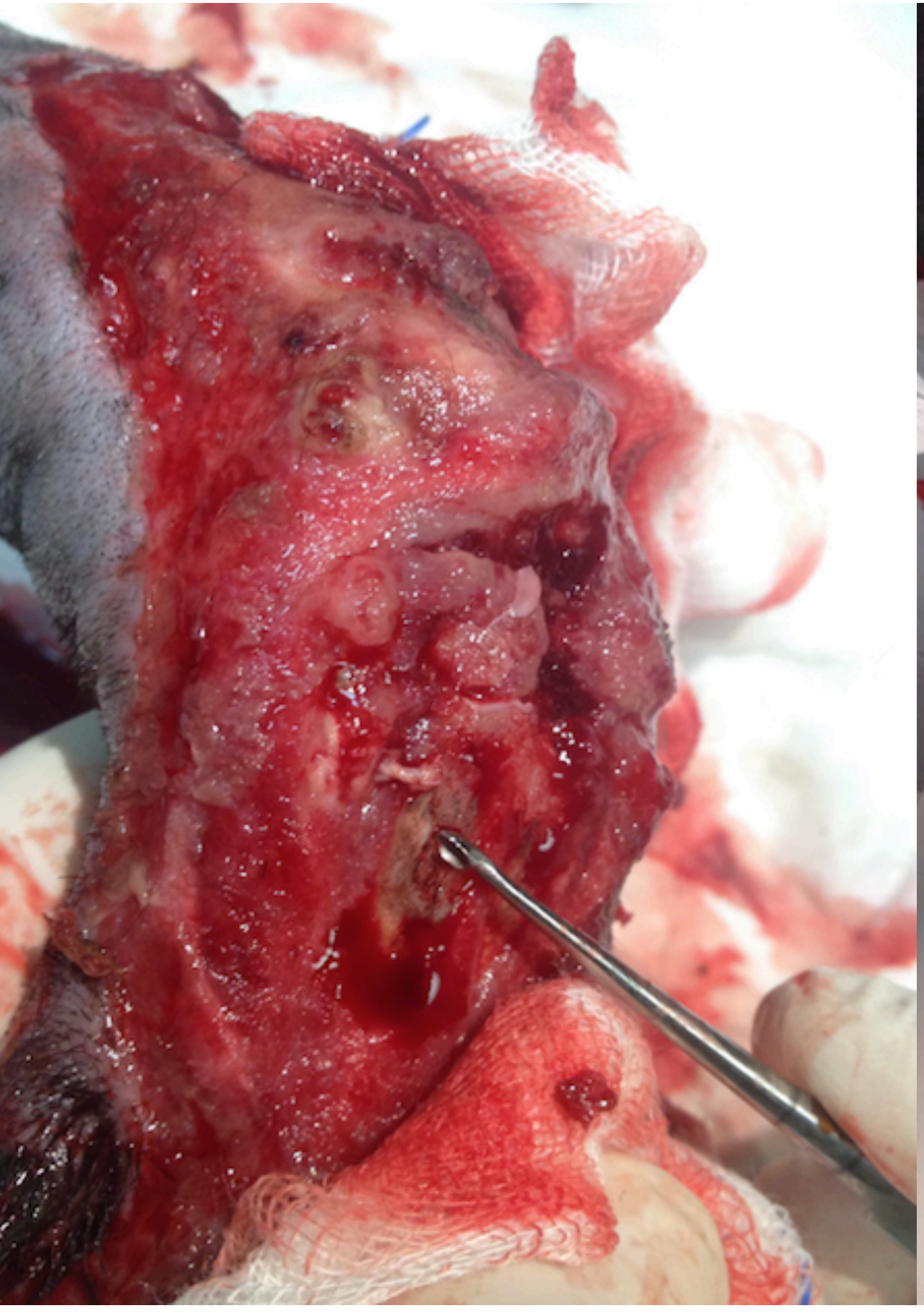
Exposed bones

- ***Osteostixis***- drilling small holes through the exposed cortical bone
- Capillary buds and **granulation proliferation**
- Caution- risk of **fracturing** bones!

Case 2

Richi

6 m, mix, 16 kg
Lost from home, found
4 days later
Limb shearing injury



3 days f up

Sugar bandage

6 days f up

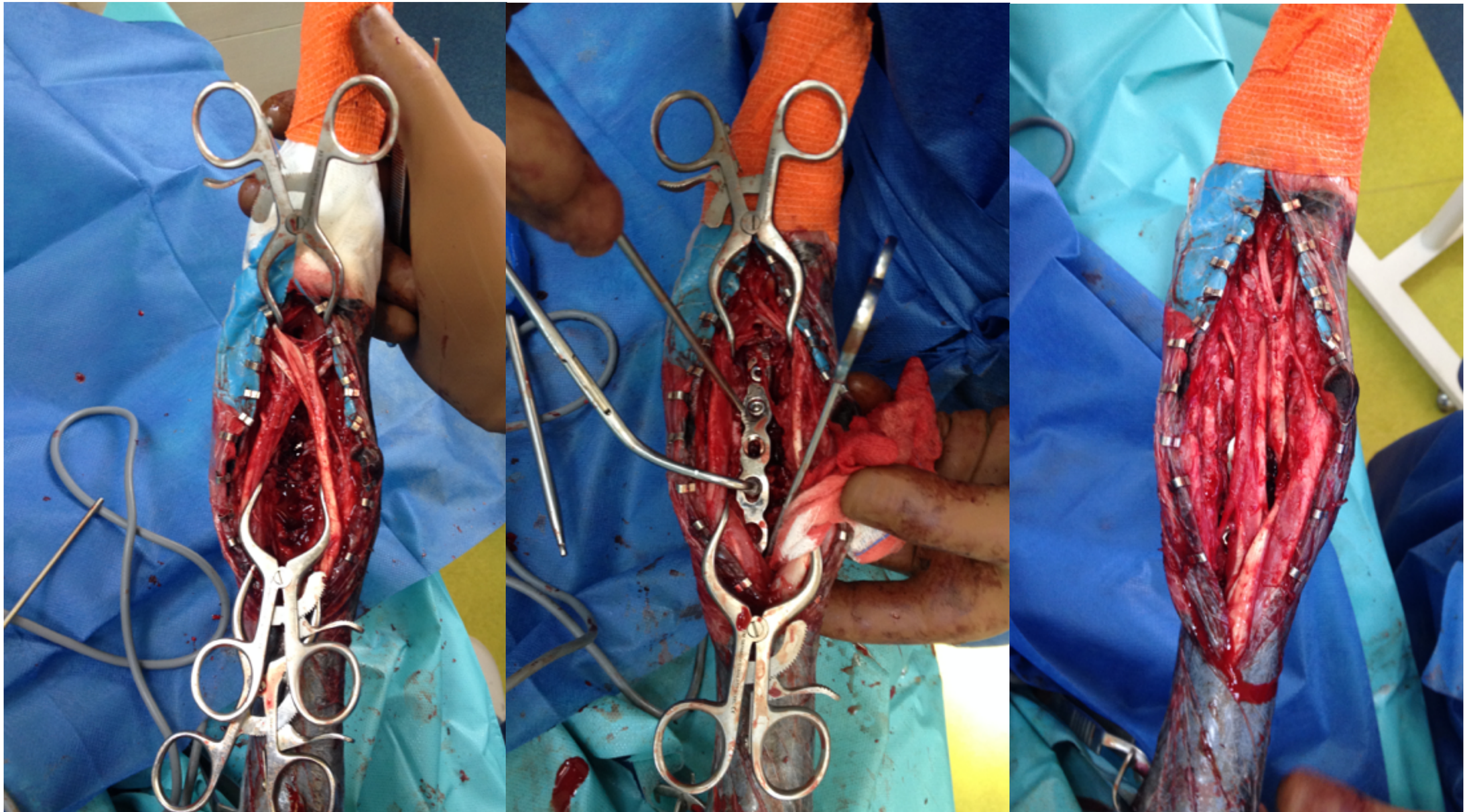
Gentamycin bandage

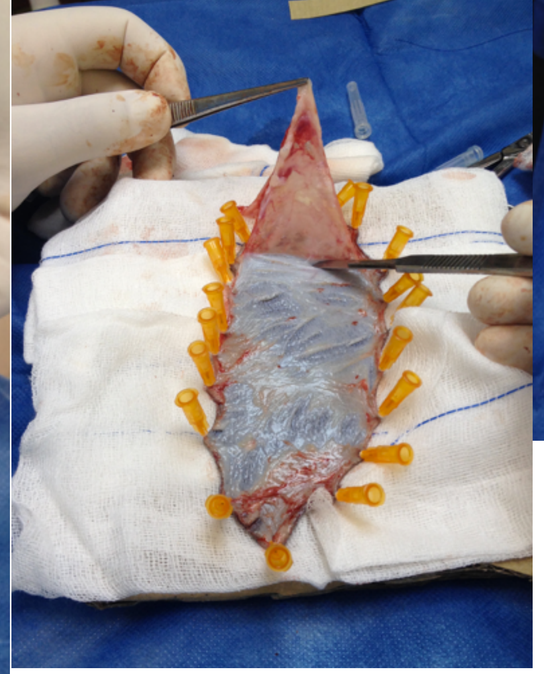
Arthrodesis surgery

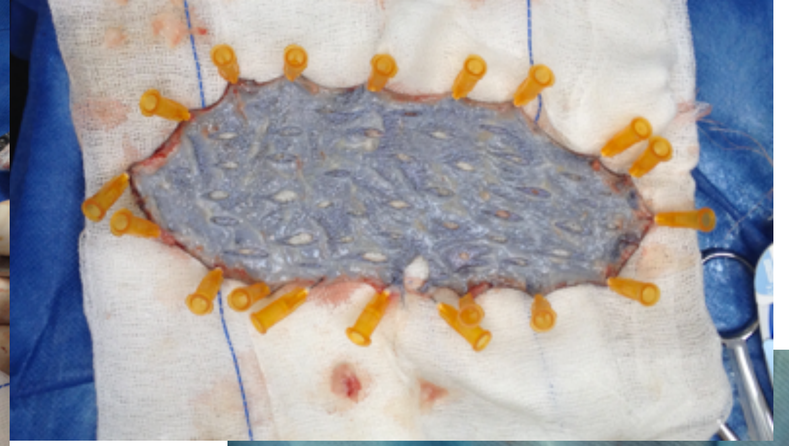
10 days after trauma

Palmar approach

Palmar approach

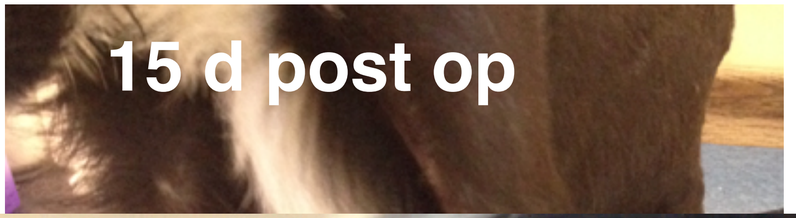


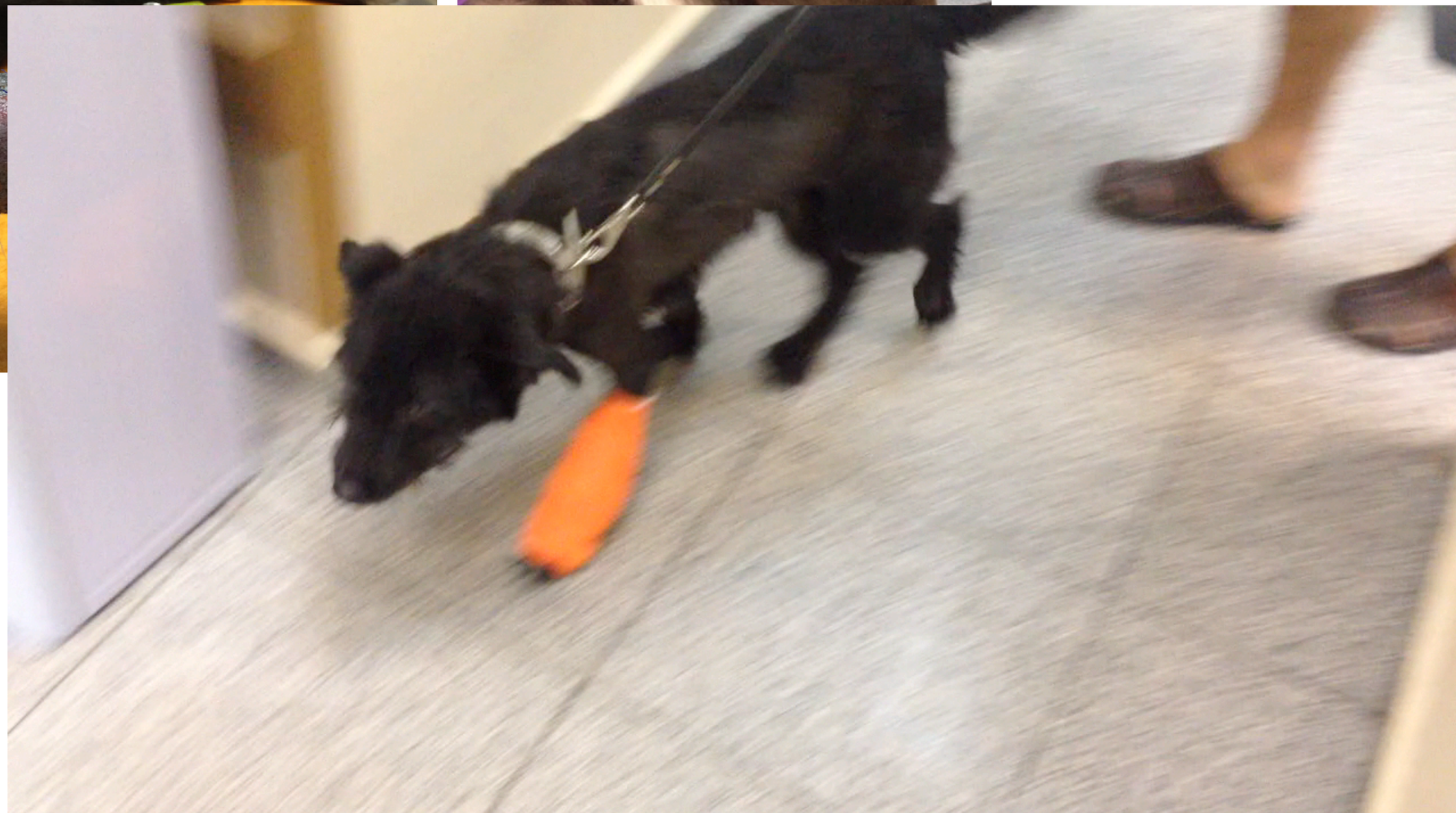




Mesh grafting


4 d post op


15 d post op



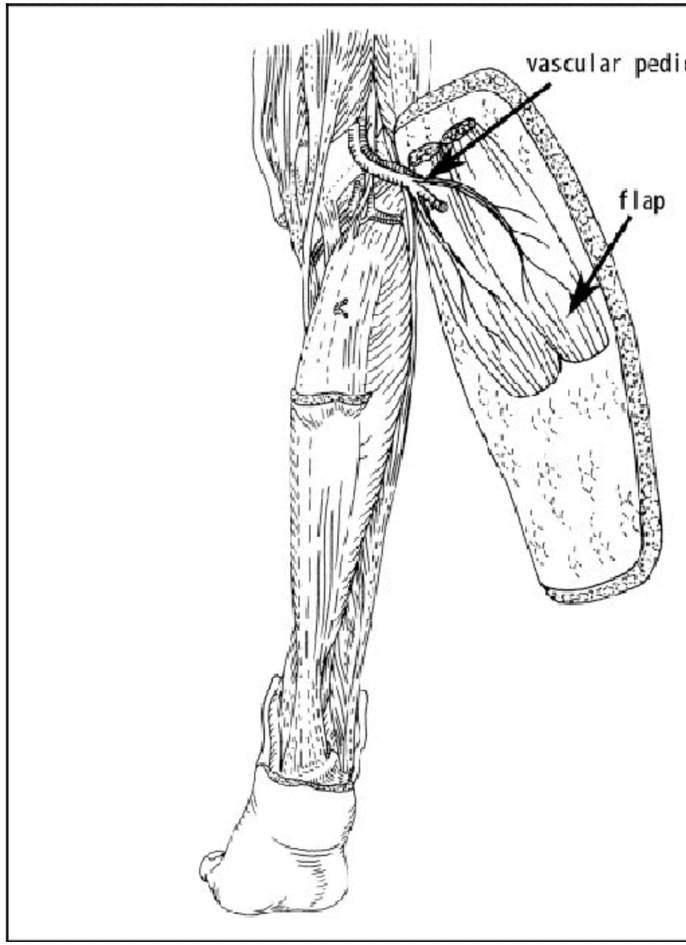

55 дни пост оп

Myocutaneous Flaps

- Skeletal muscle and the overlying skin.

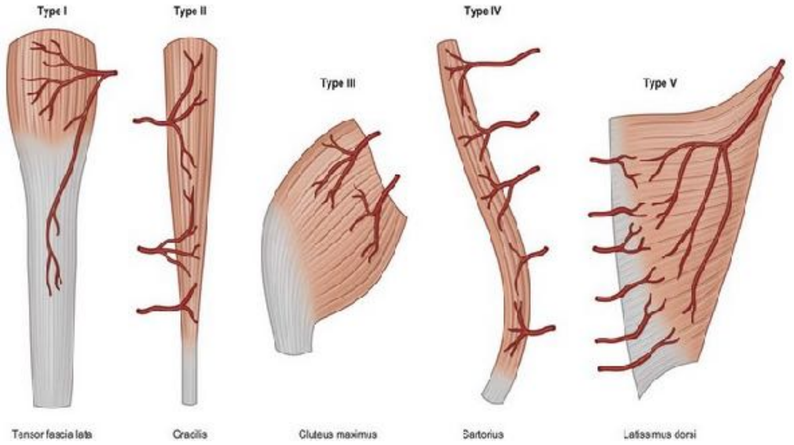
- In humans- blood to the skin through musculocutaneous arteries exiting **the muscle surface.**

- In dogs and cats- **direct cutaneous arteries.**



Muscles Flaps

- **<u>Individual skeletal muscles</u>** to repair body defects, mostly body walls.



- Contributing additional circulation

- Limited clinical application?!

Muscle– tendon transposition

- Palliative for paralysis- radial nerve and peroneal nerve.

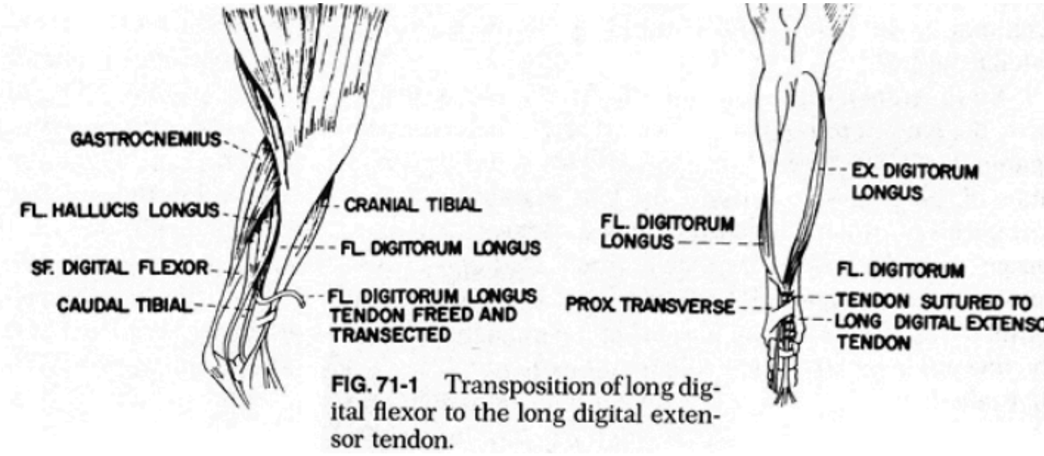
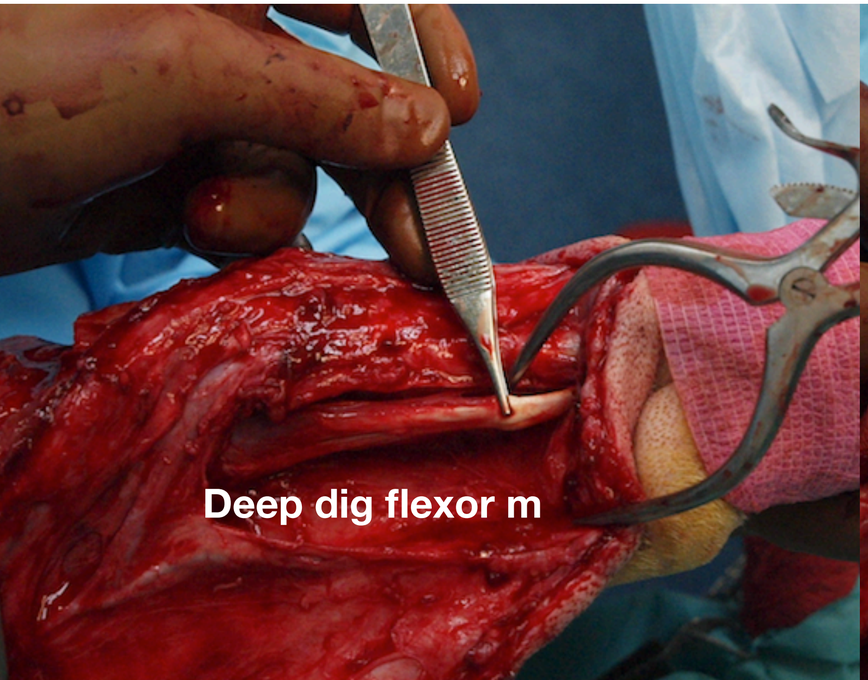
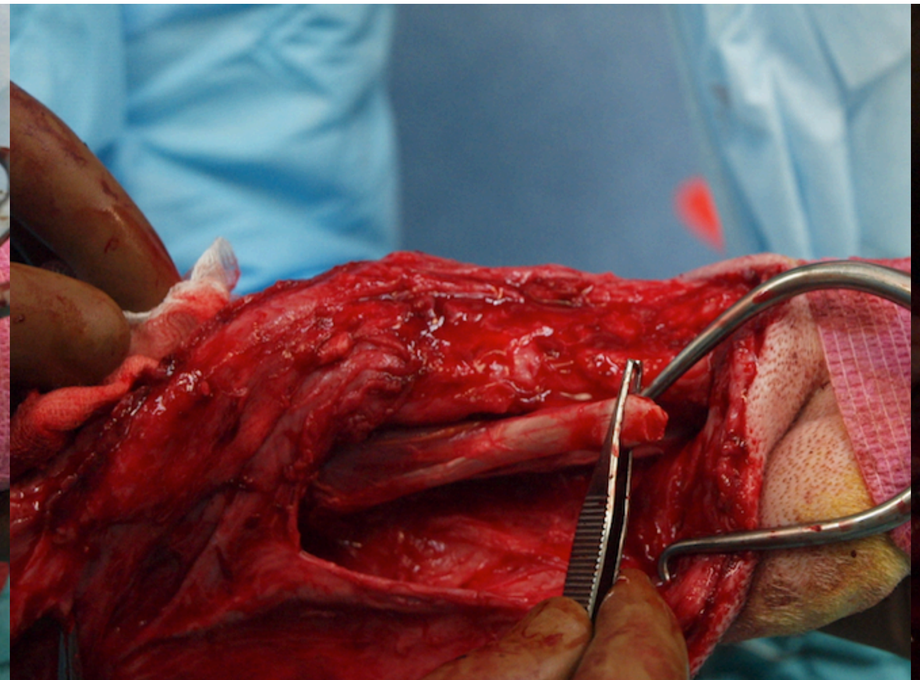
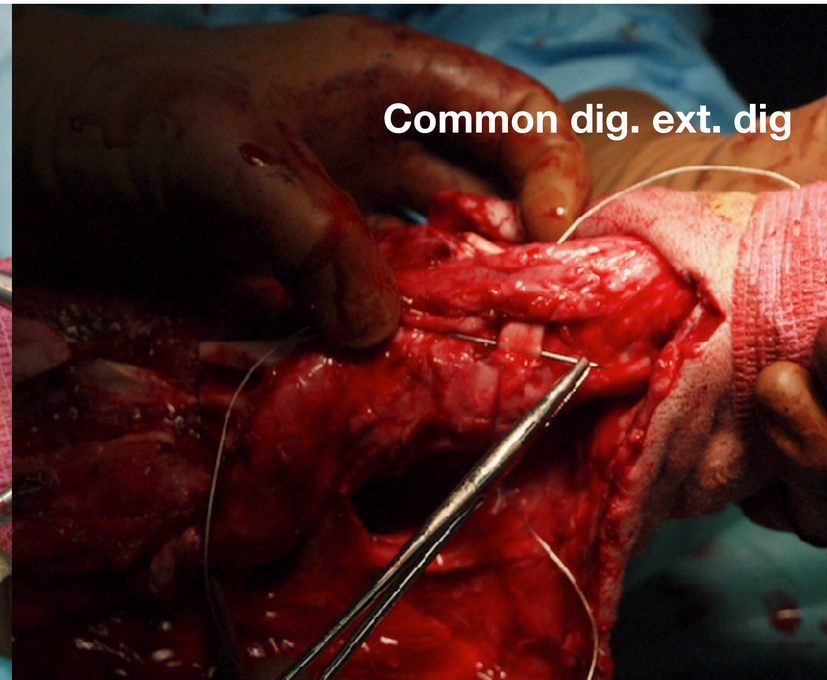


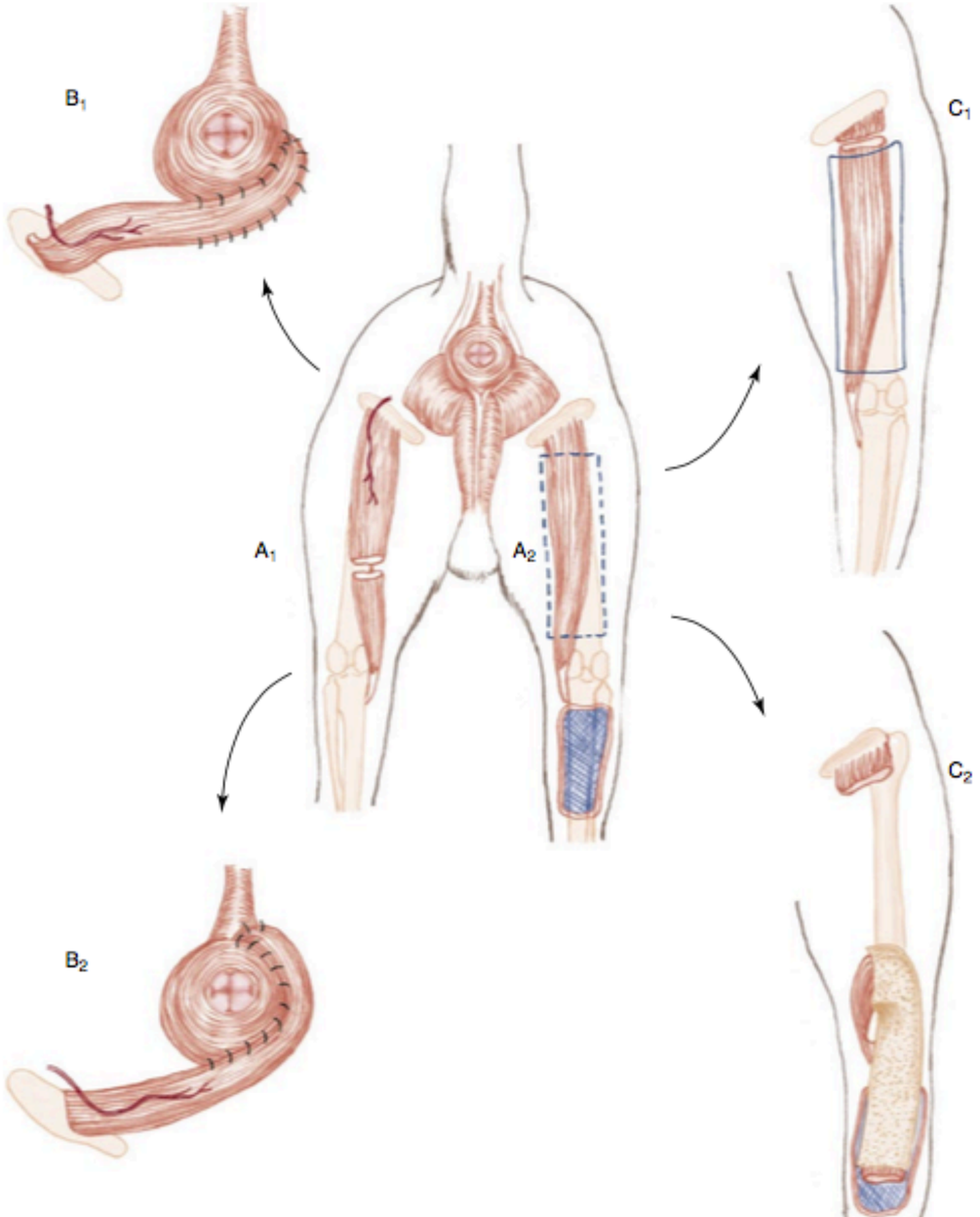
FIG. 71-1 Transposition of long digital flexor to the long digital extensor tendon.



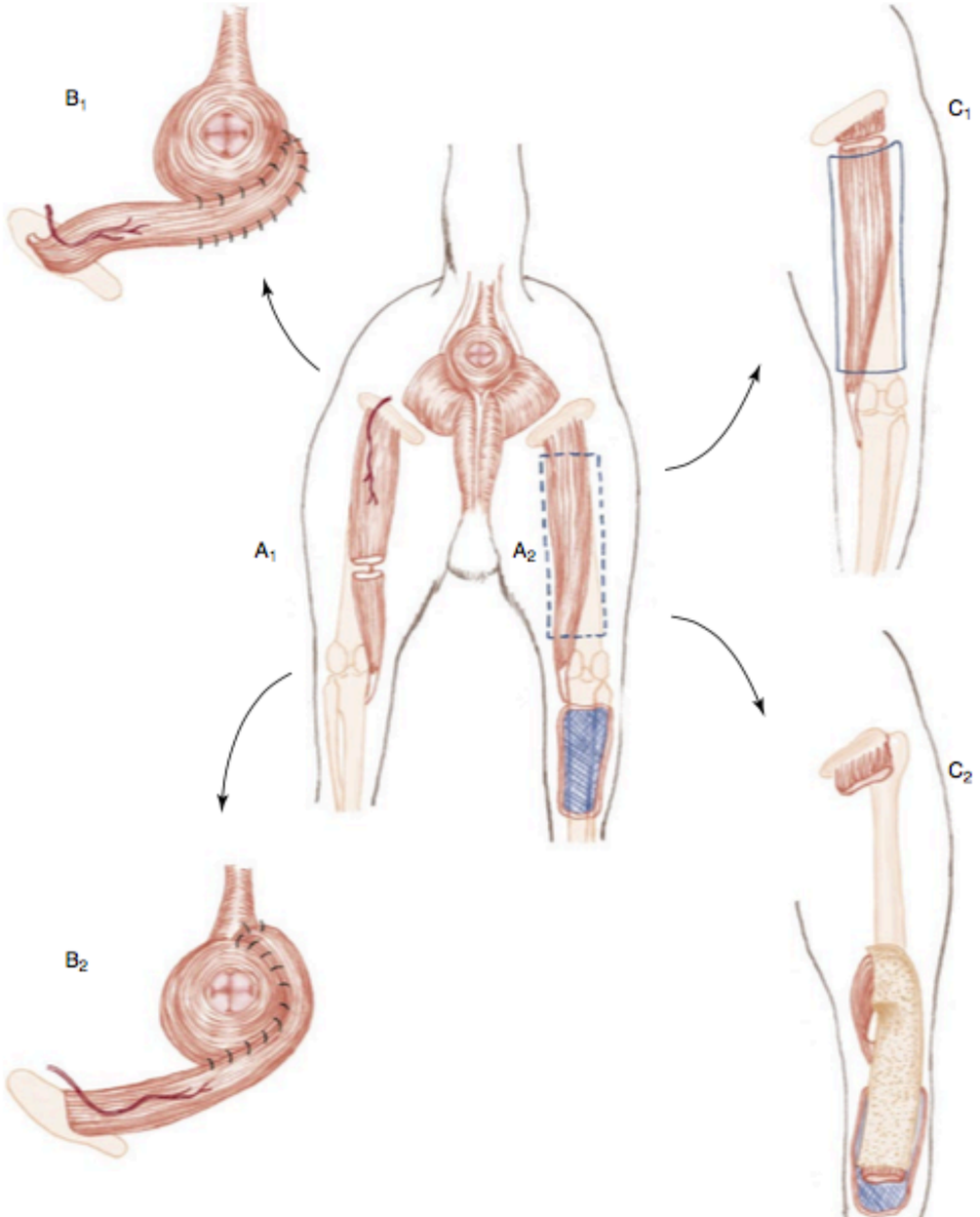


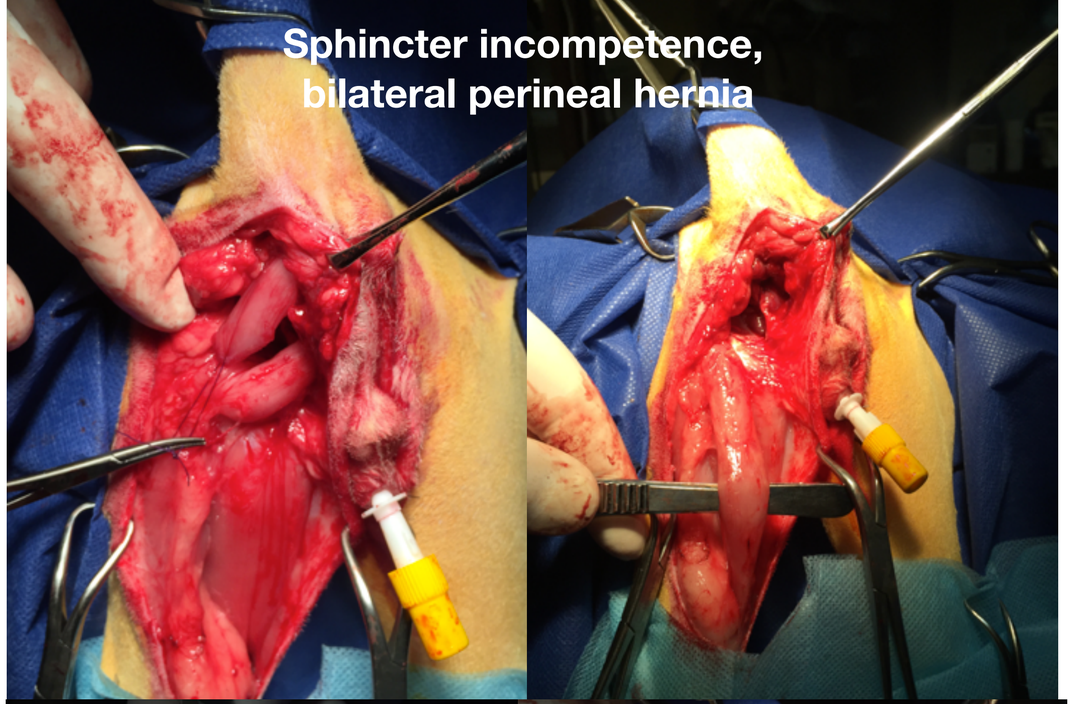


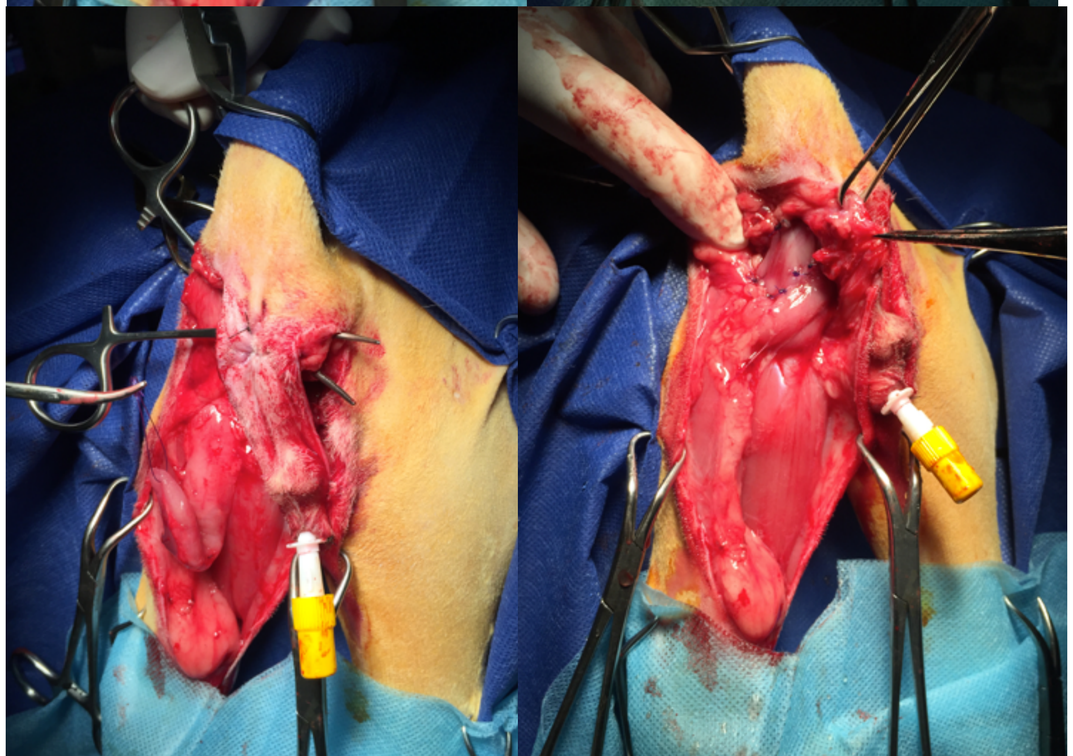
Semitendinosus Muscle Flap



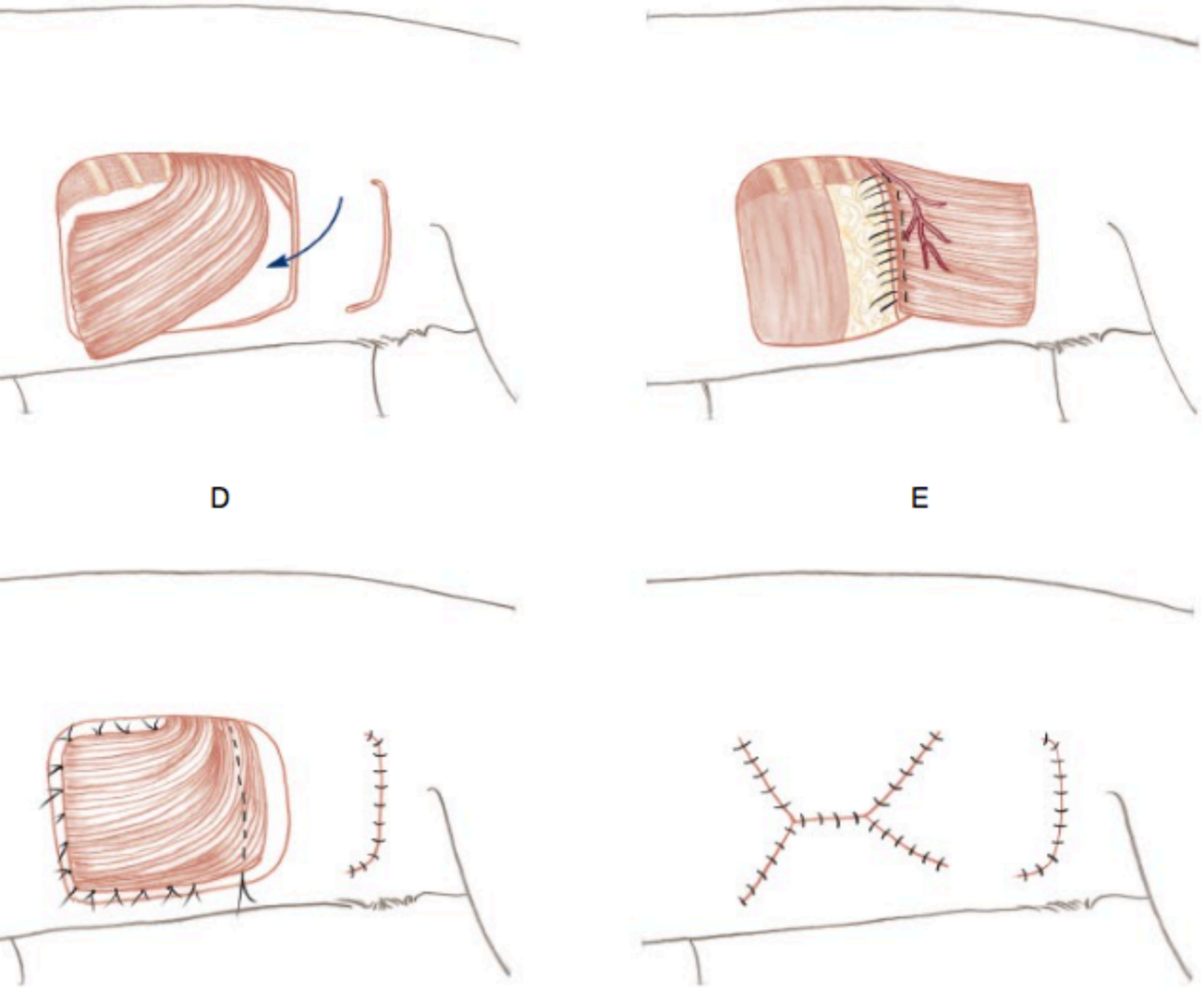
Semitendinosus Muscle Flap



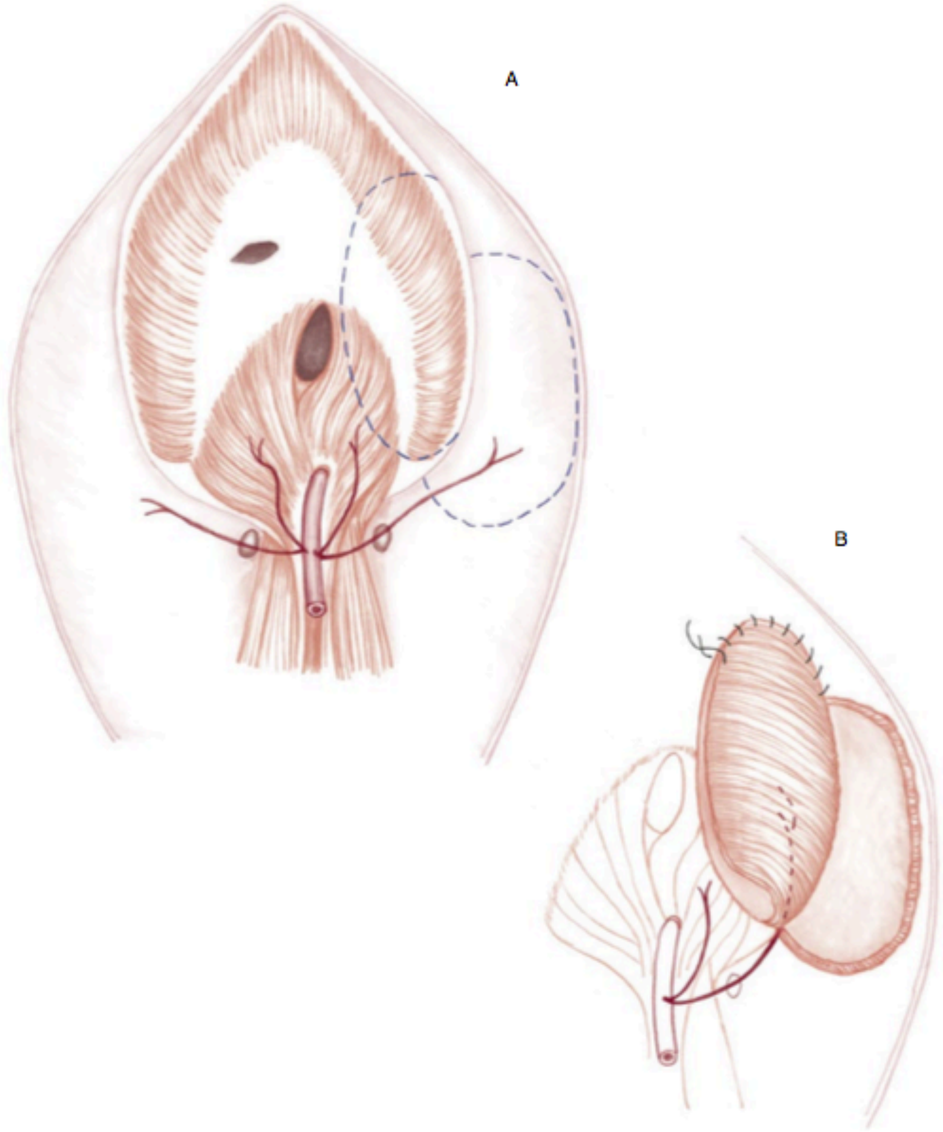




External Abdominal Oblique Muscle Flap



Transversus Abdominis Muscle Flap



Thoracic and abdominal wall reconstruction

- Small defects- combination of **muscle advancement** and transposition.
- Large defects- reconstruction by **synthetic meshes.**
- Extensive defects (i.e. more than 5 or 6 ribs)- **mechanically resistant** reconstruction**.**

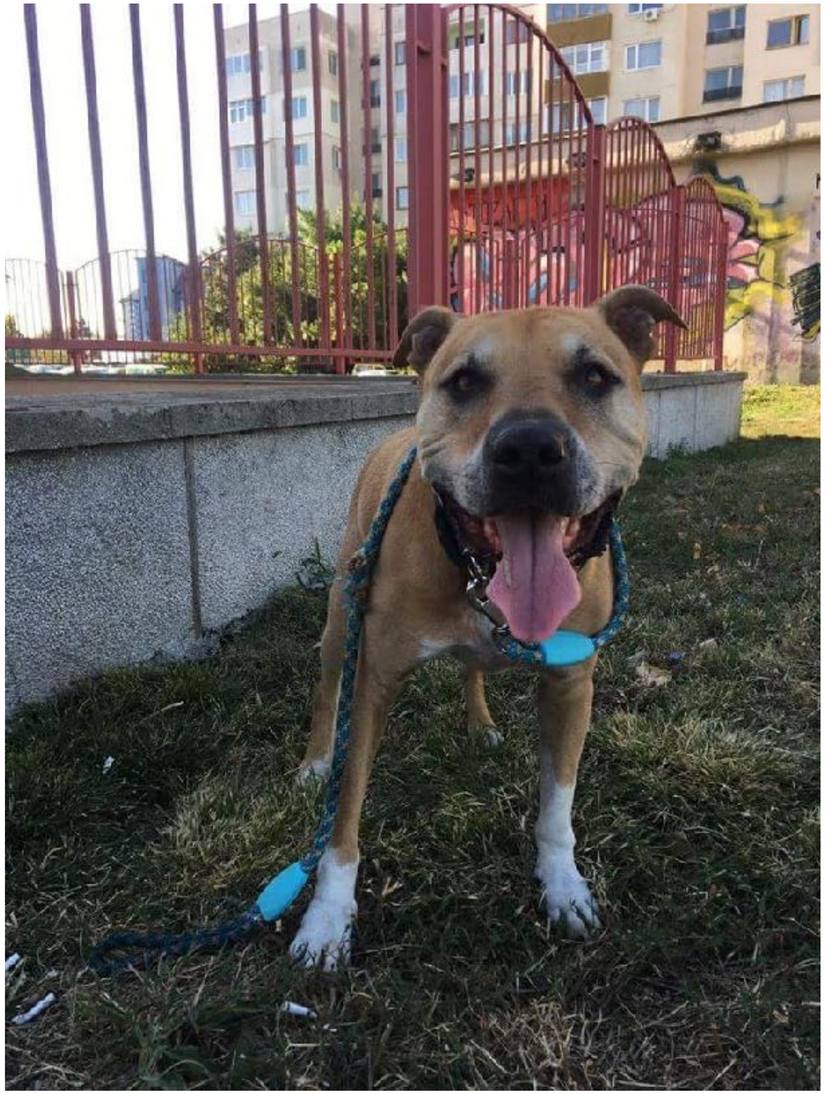
Case 3

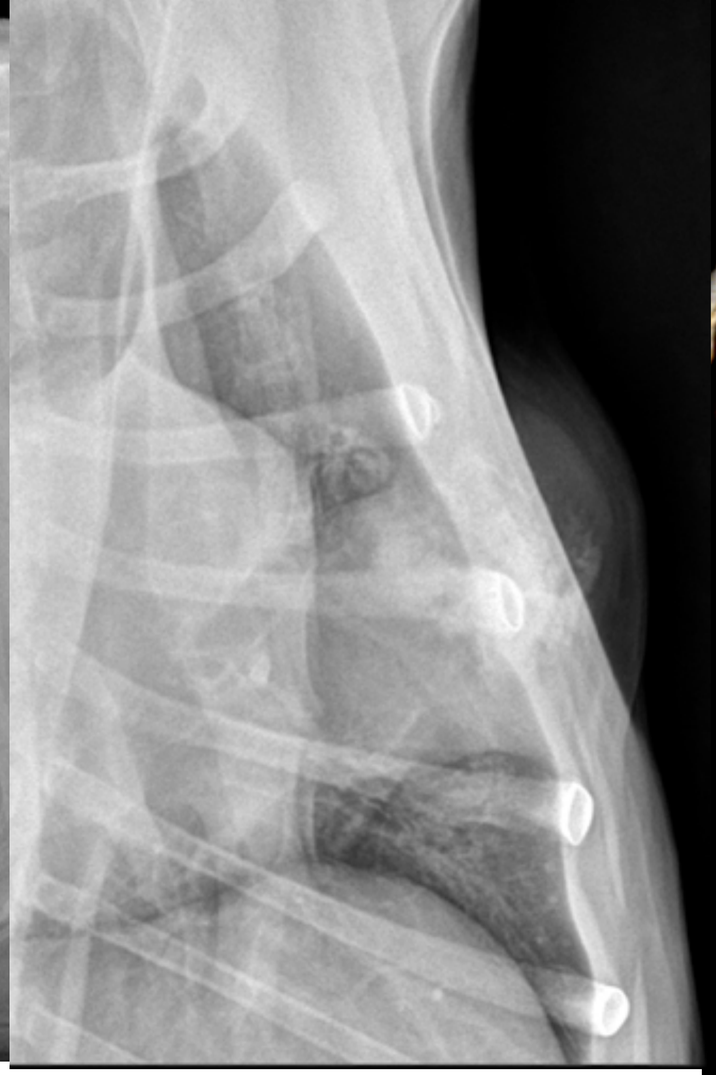
Mars

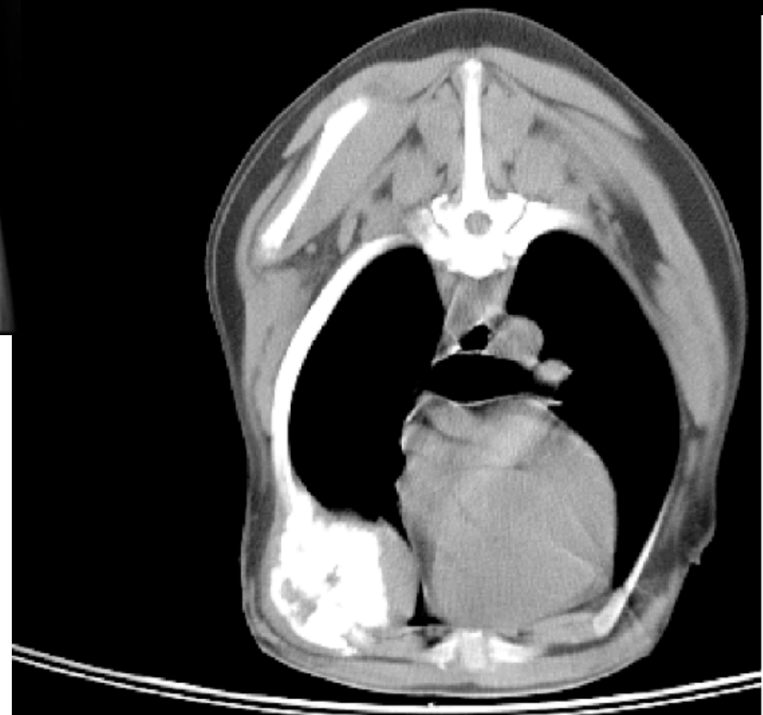
10 y old, male pit bull

Front right leg lameness

Lump on the right chest

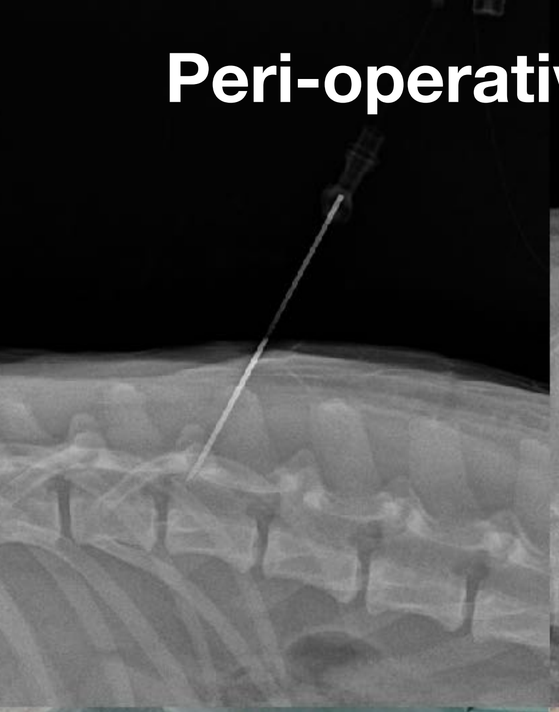




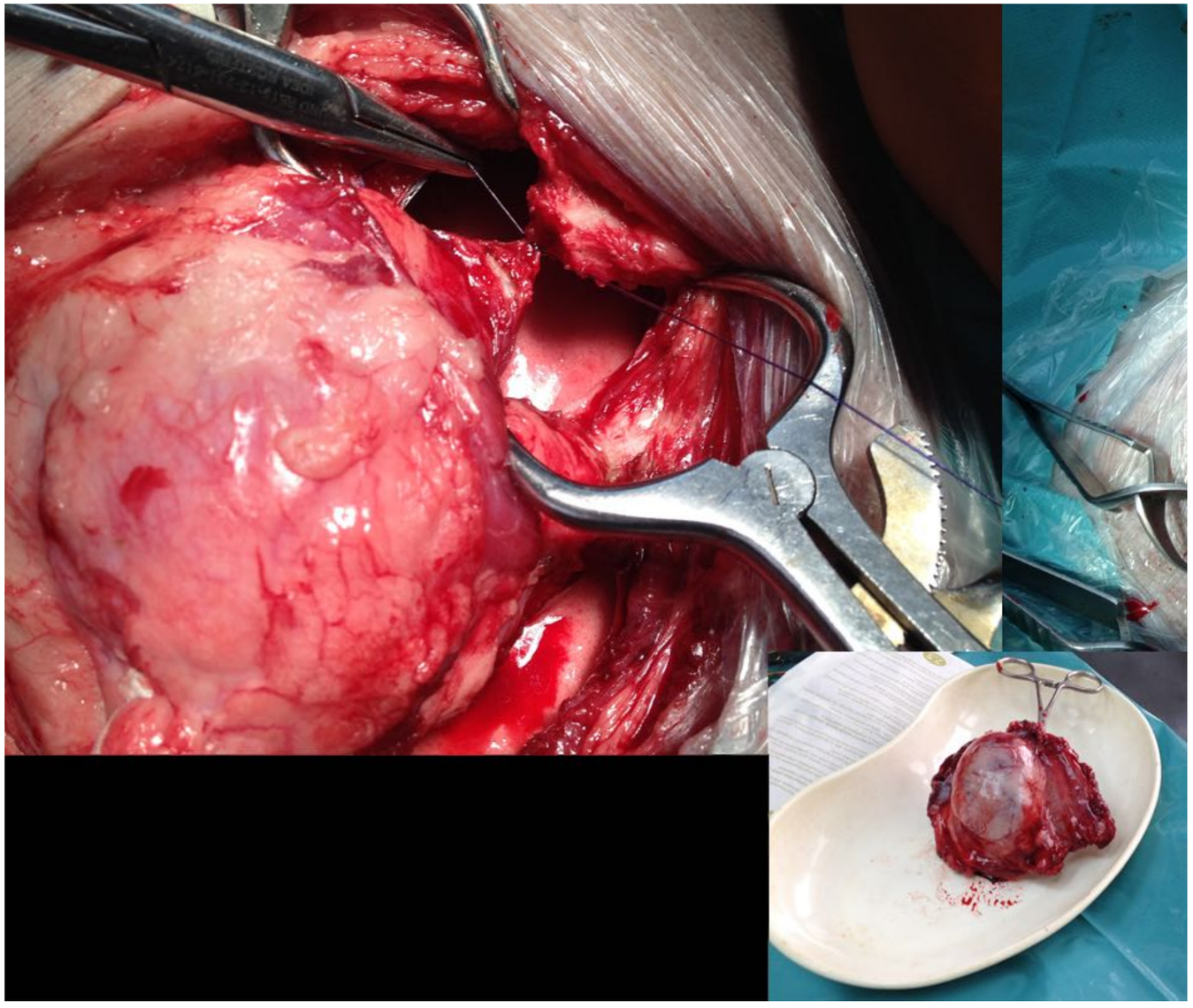


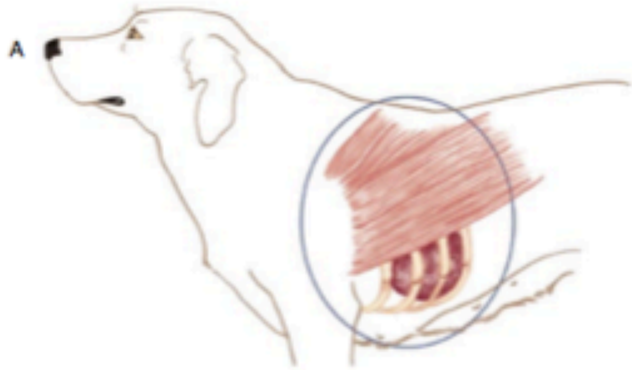
FNA: osteosarcoma, high malignancy

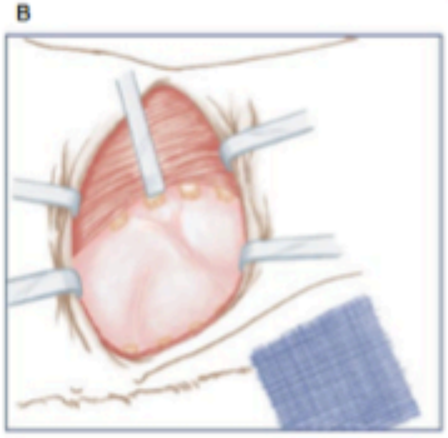
Peri-operative analgesia

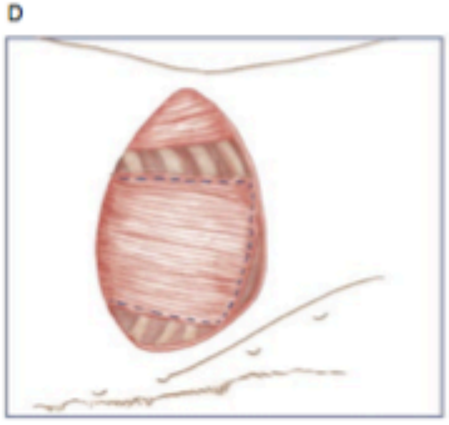


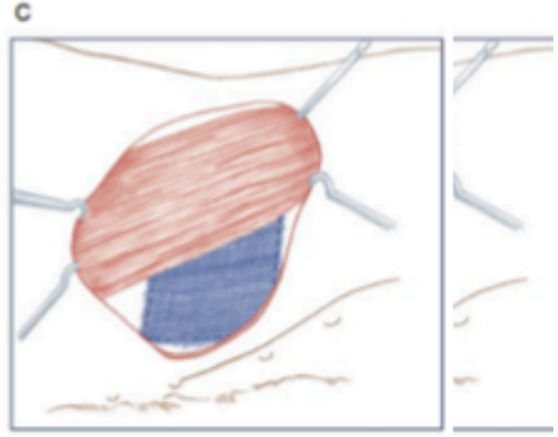
Latissimus Dorsi Myocutaneous Flap

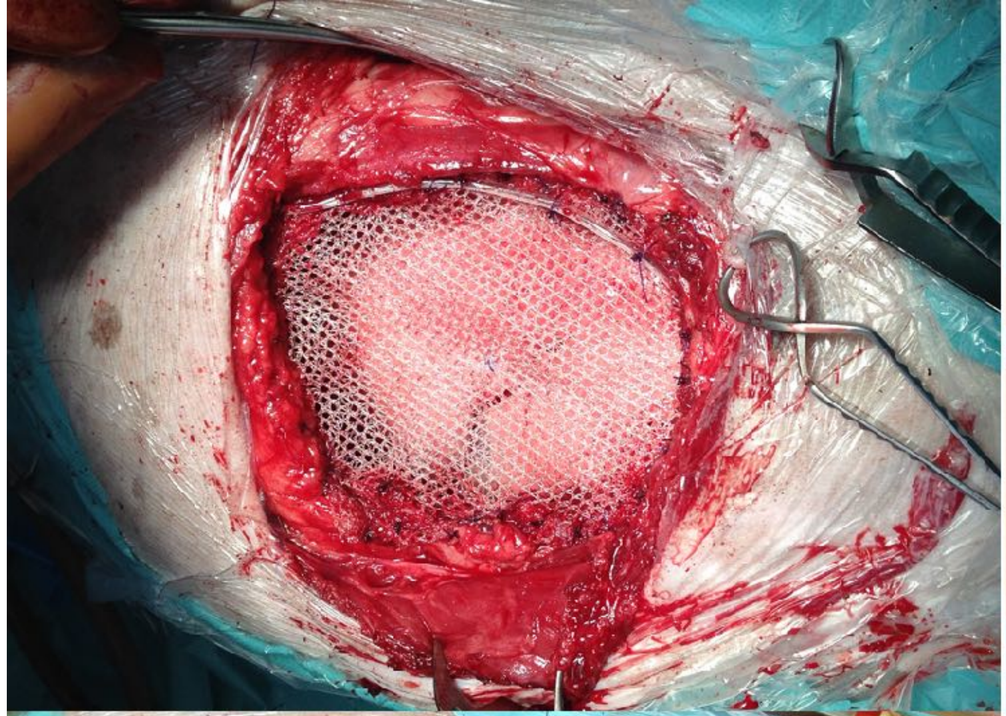
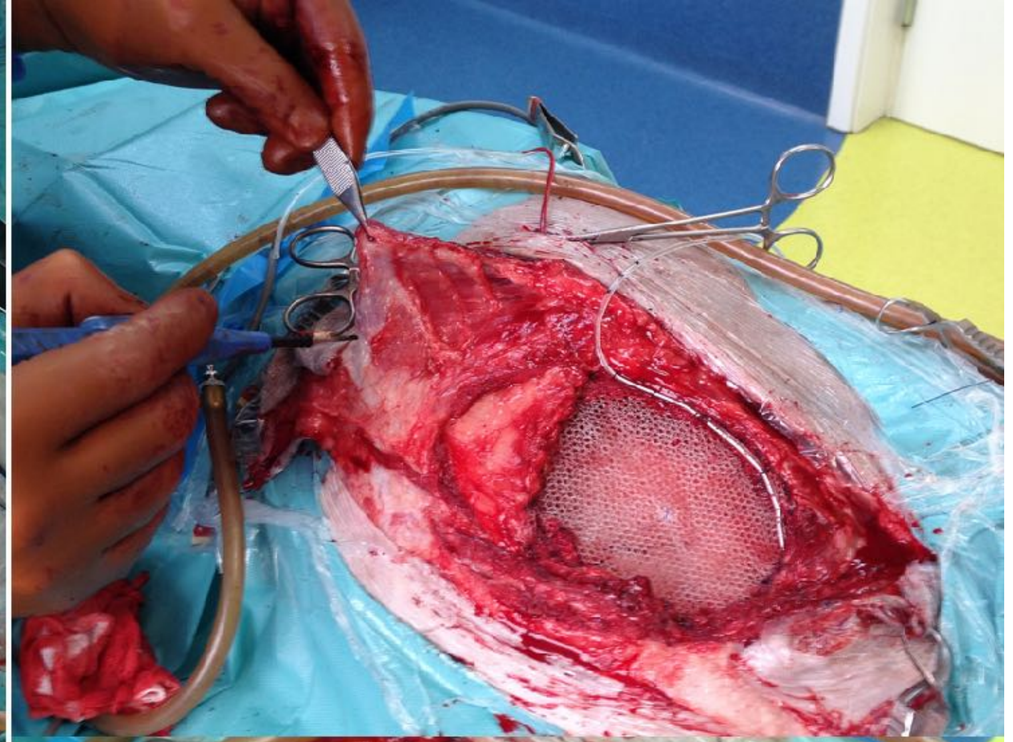
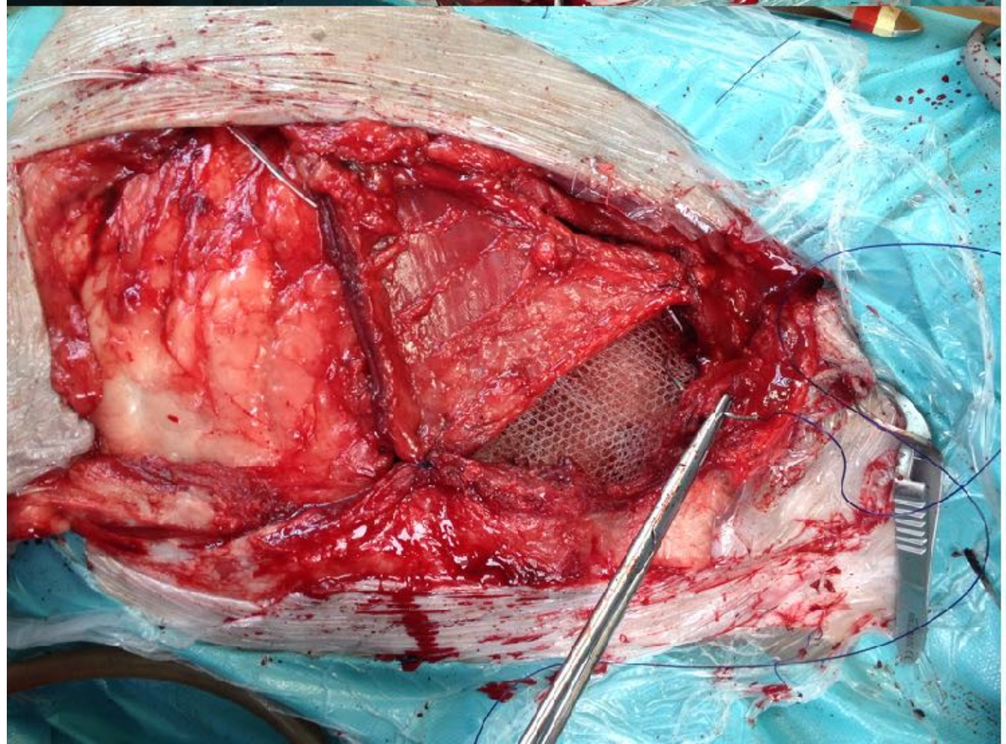
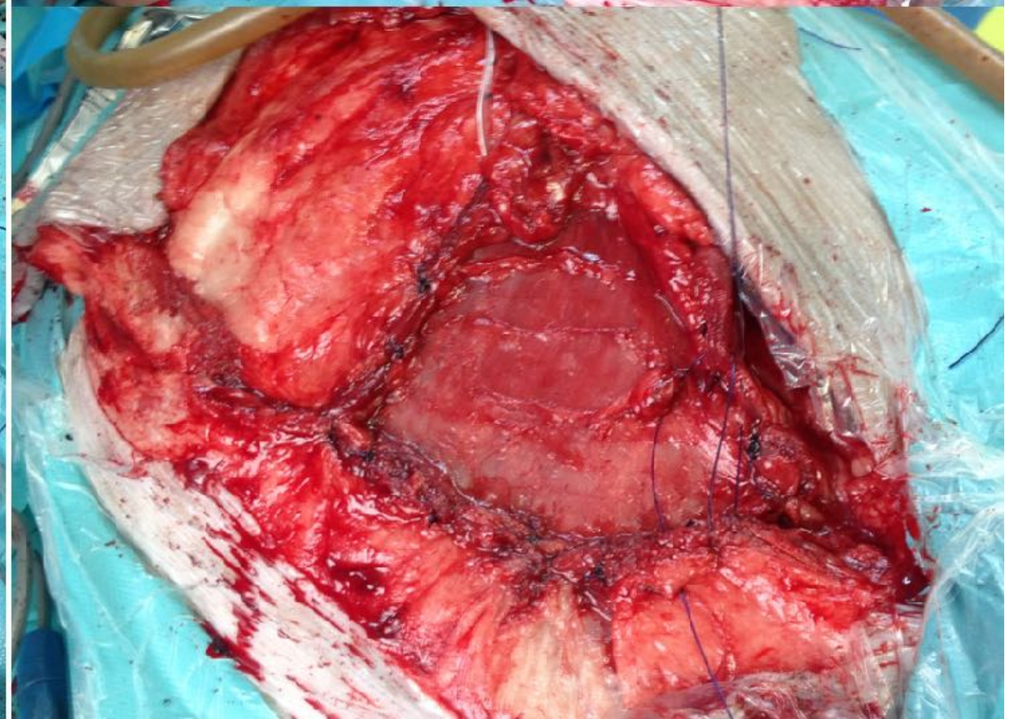










1 d f up

3 d f up


15 d f up


60 d f up

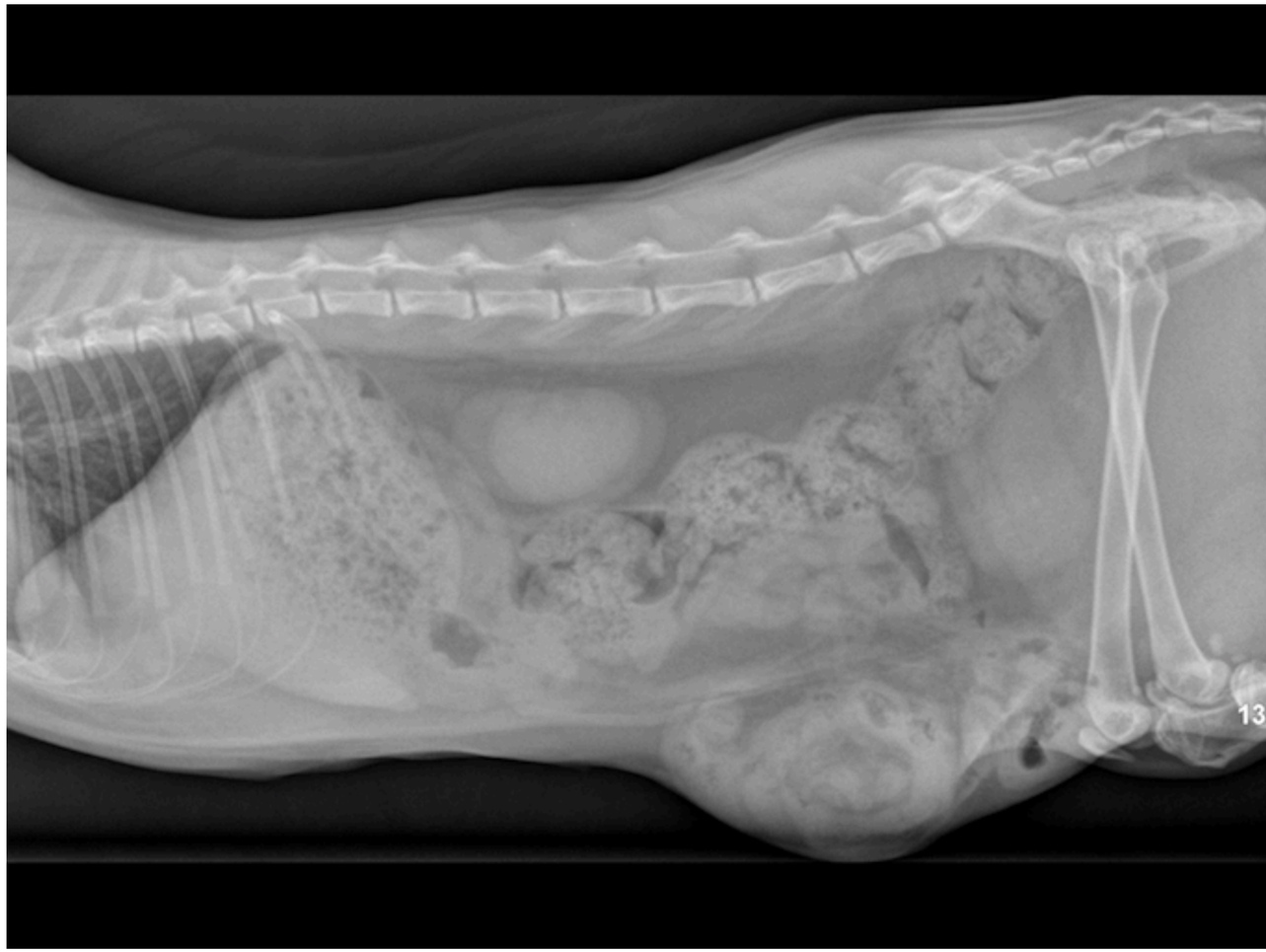
Case 4

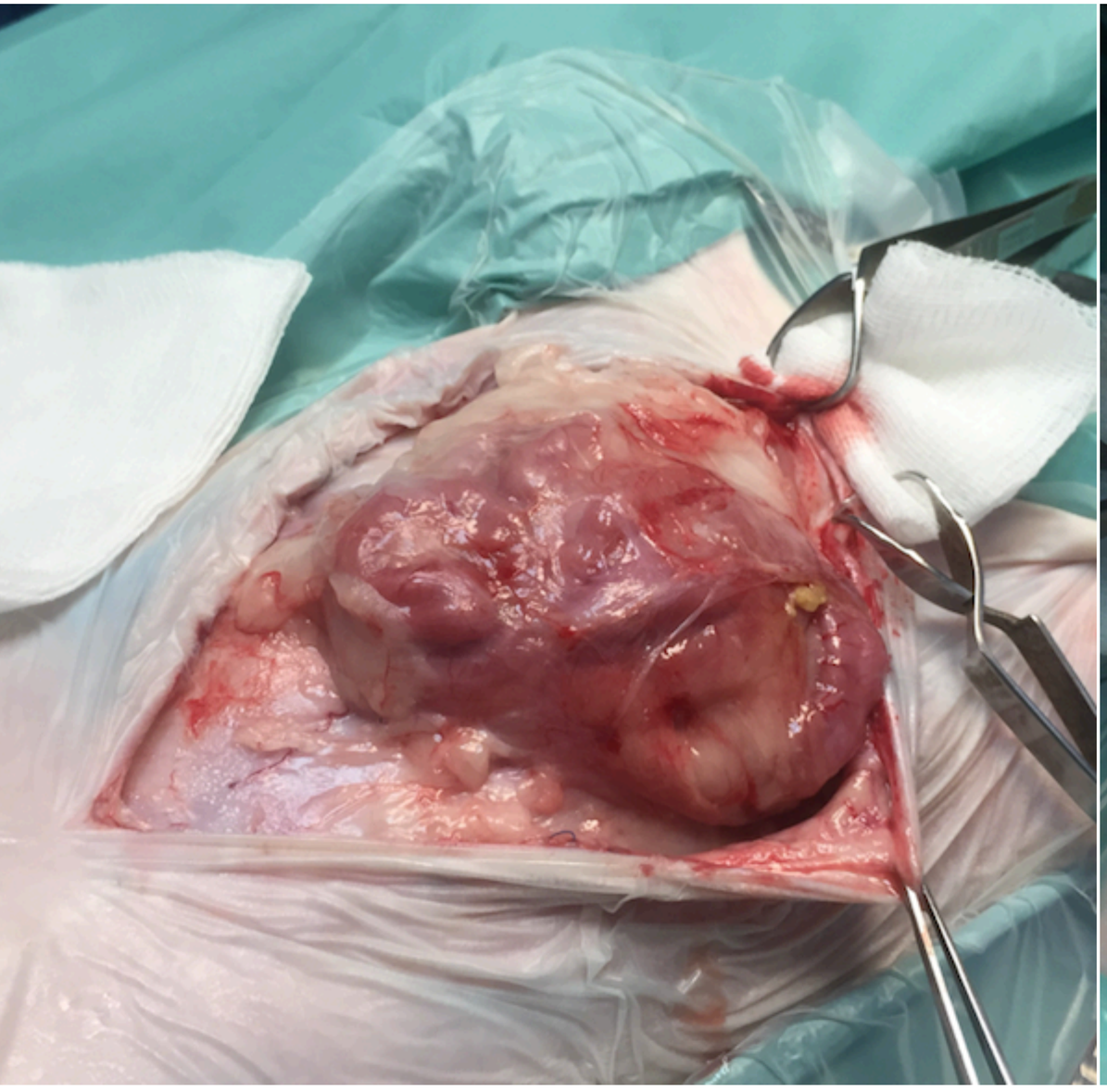
Madita

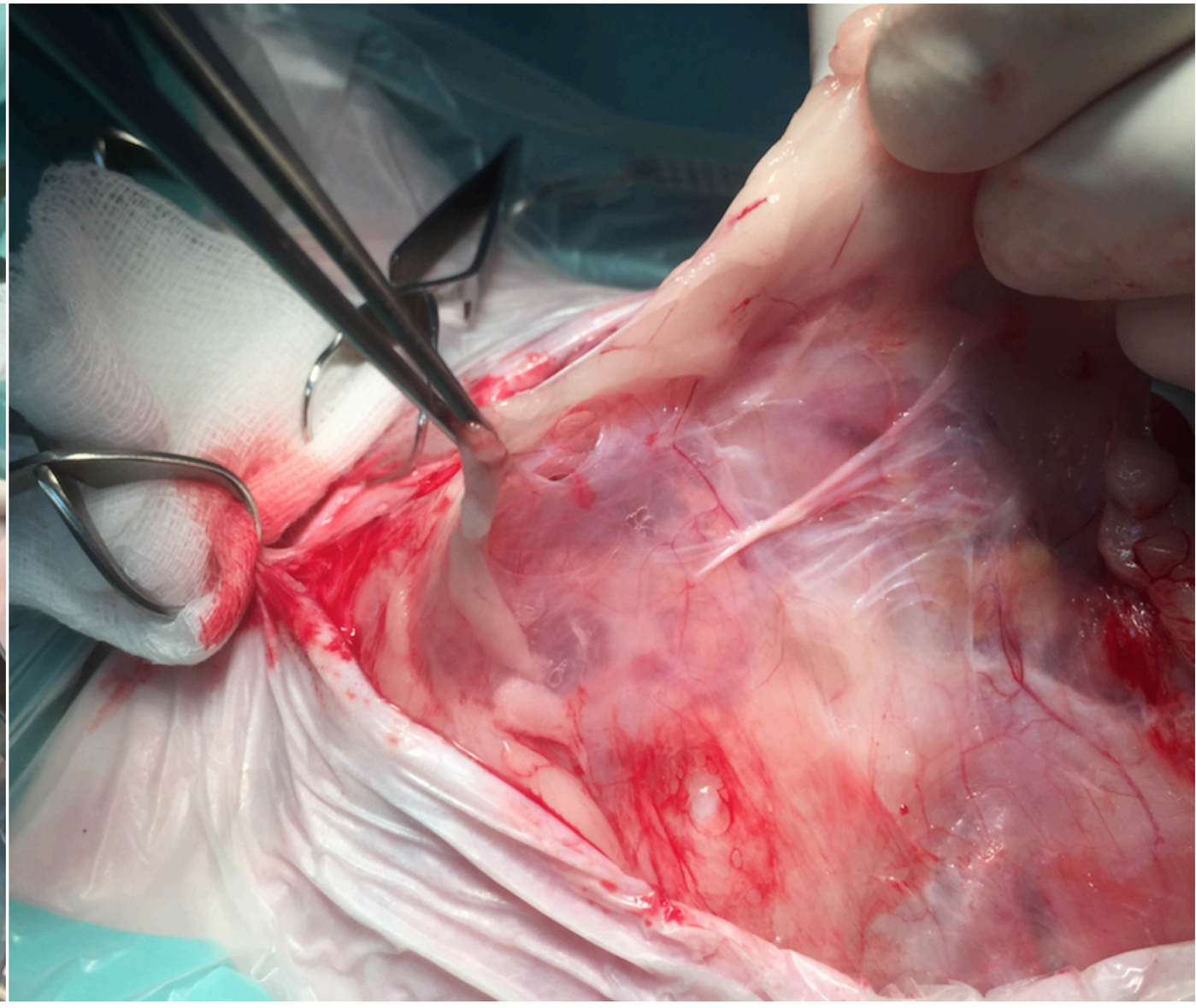
1 y old, ESH, female

Eventration of unknown origin

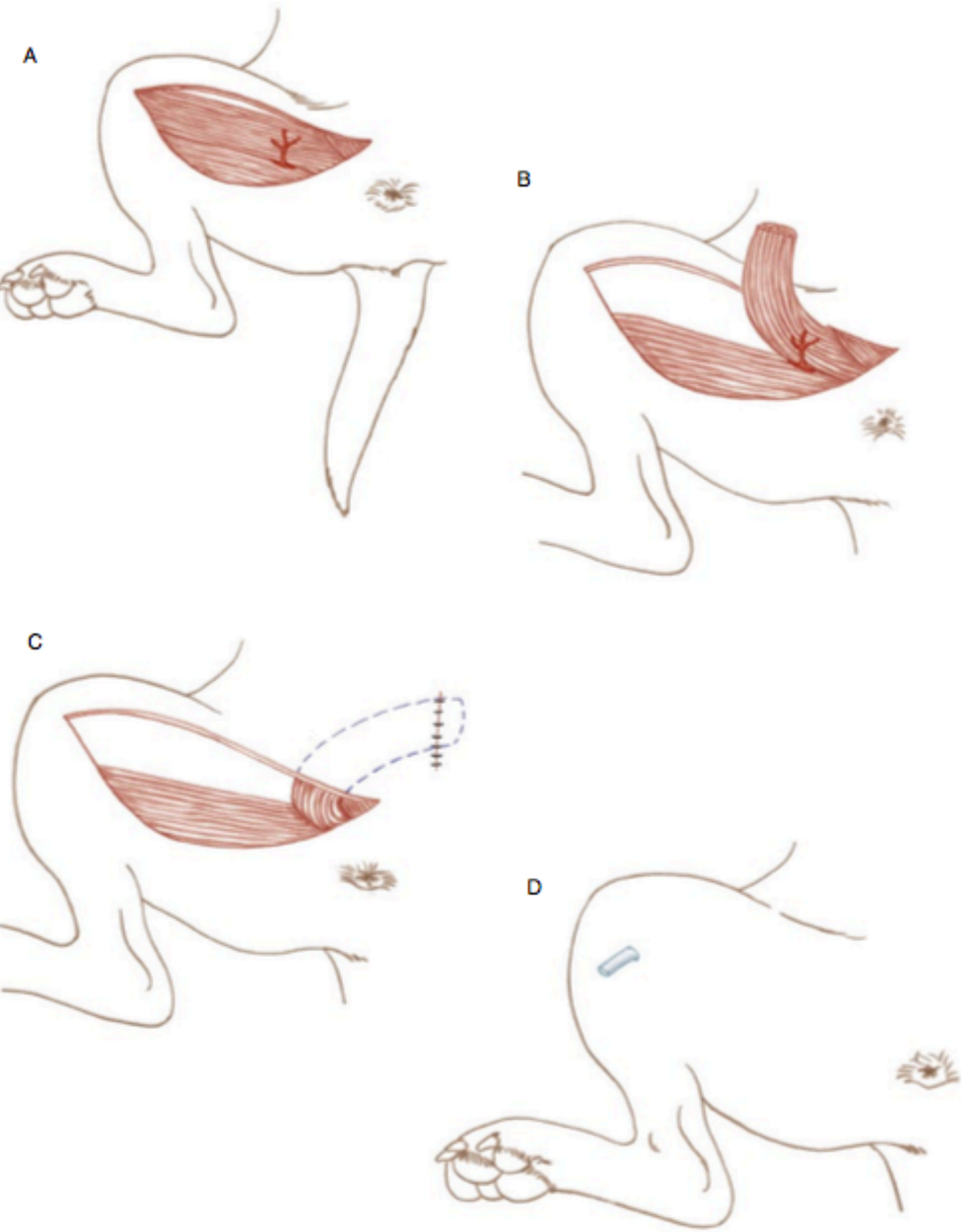
3 previous reconstructions

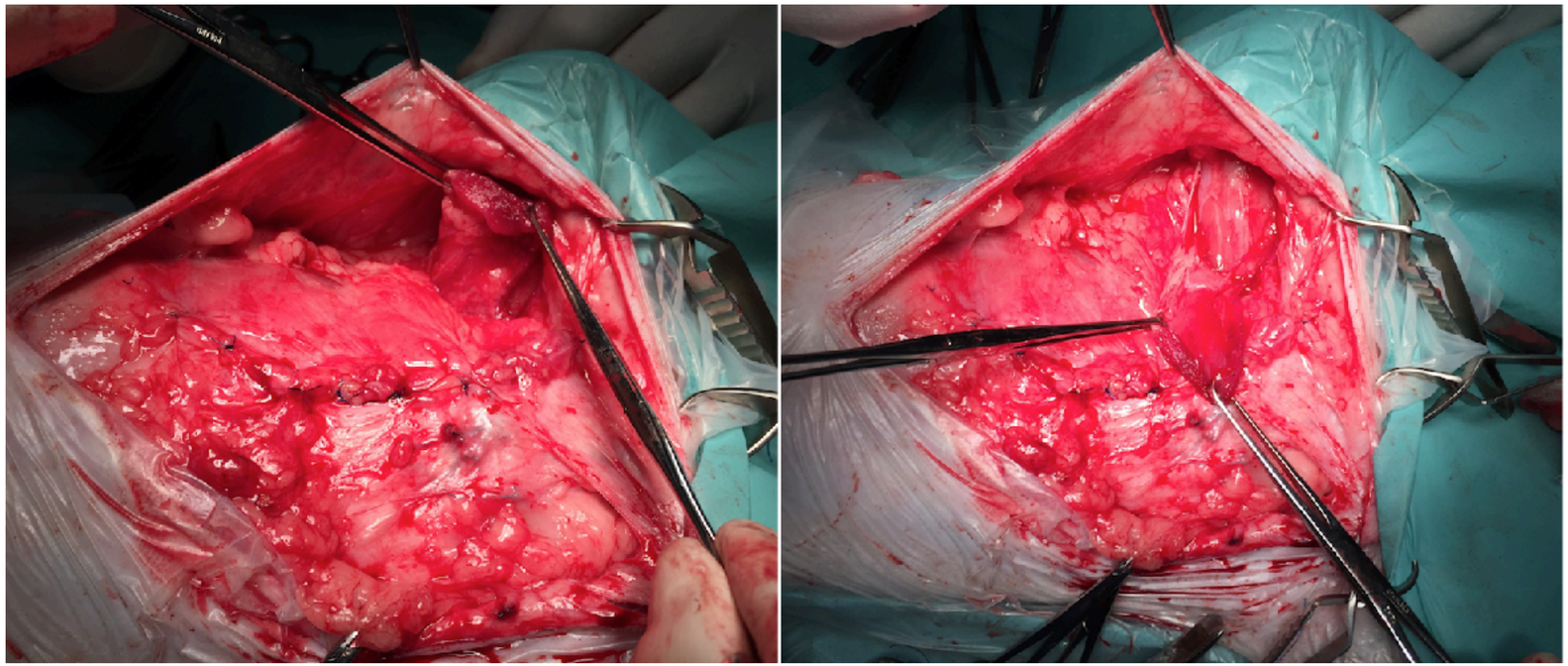


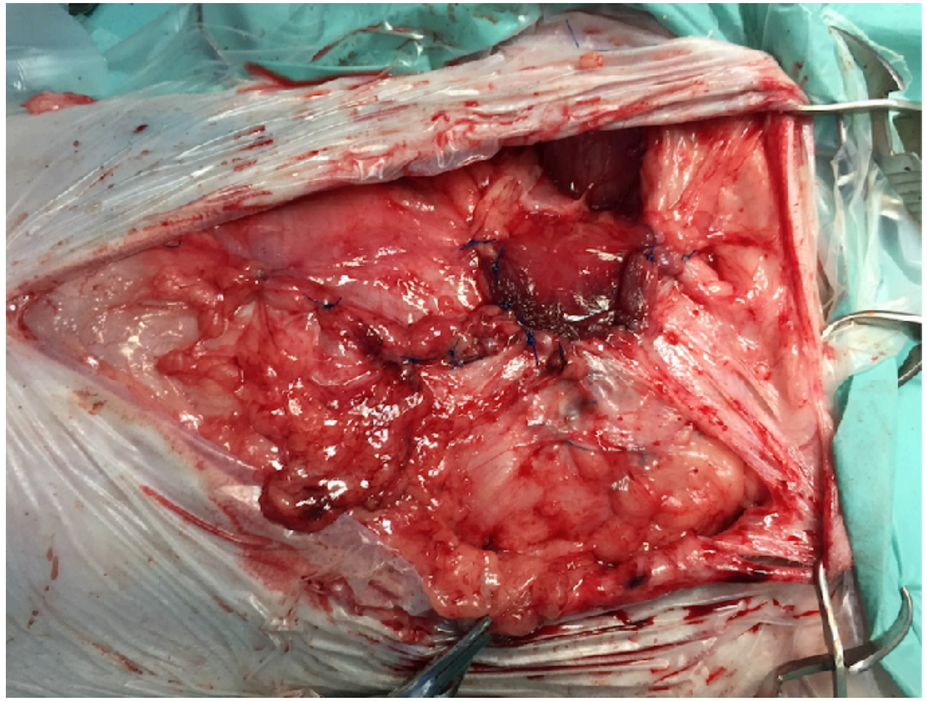


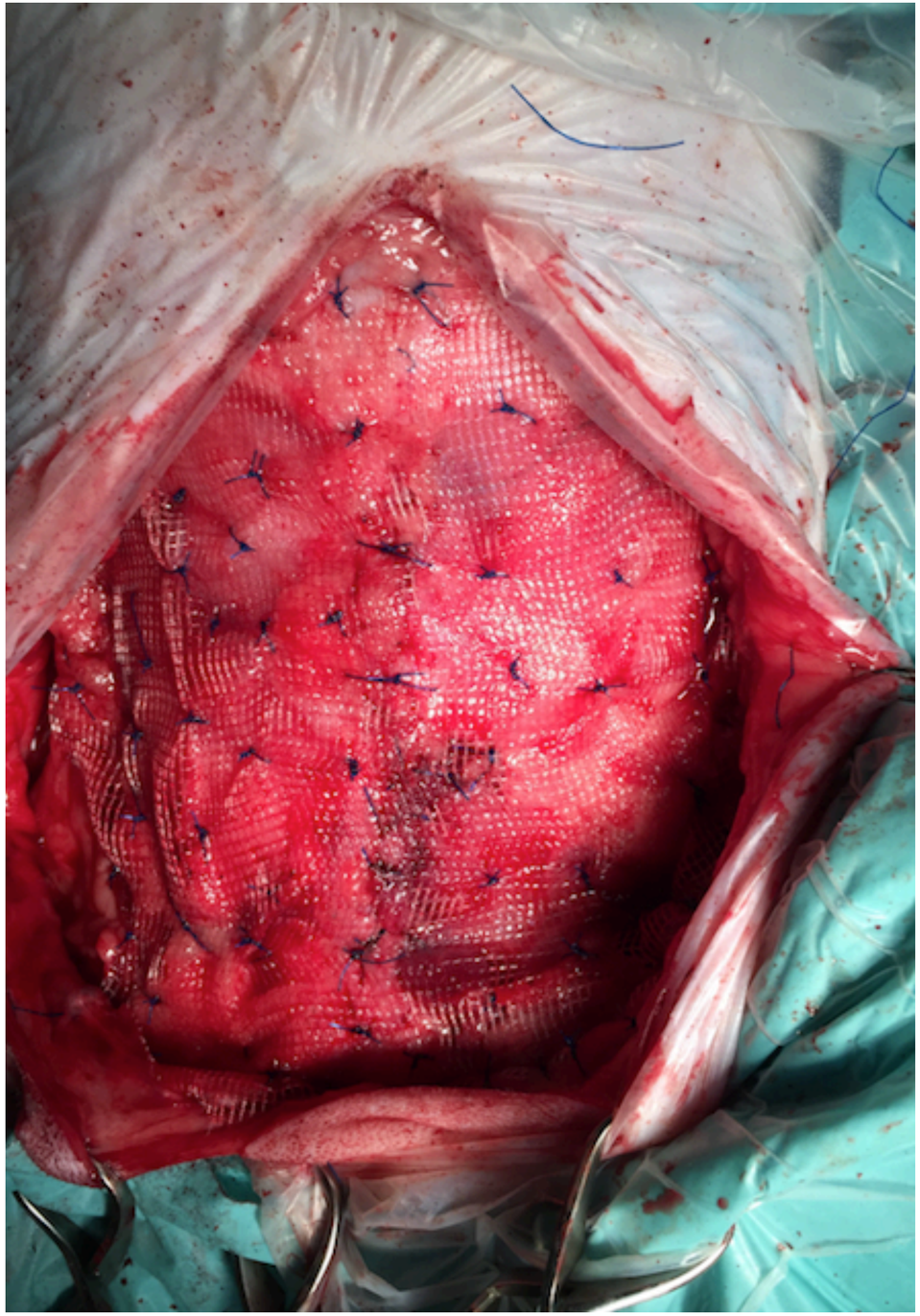


Cranial Sartorius Muscle Flap





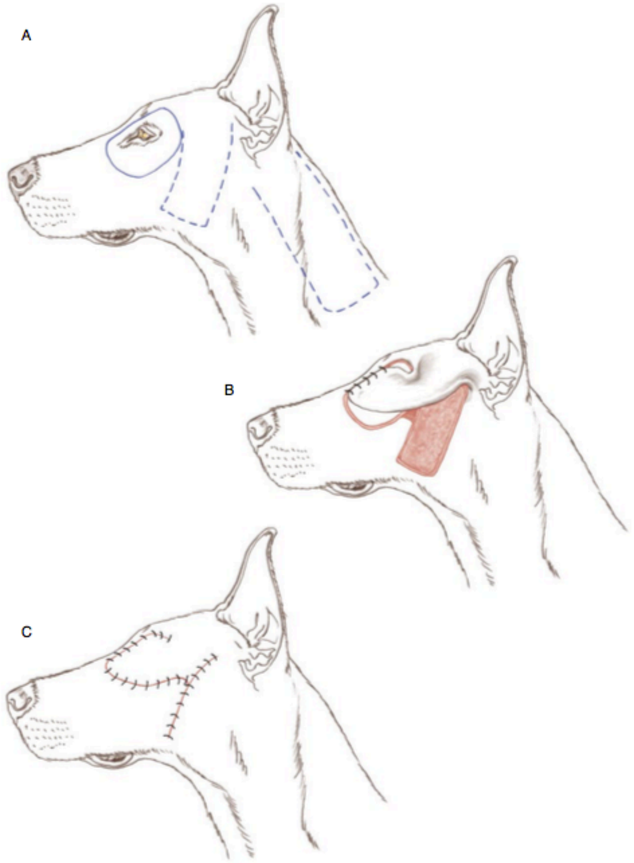


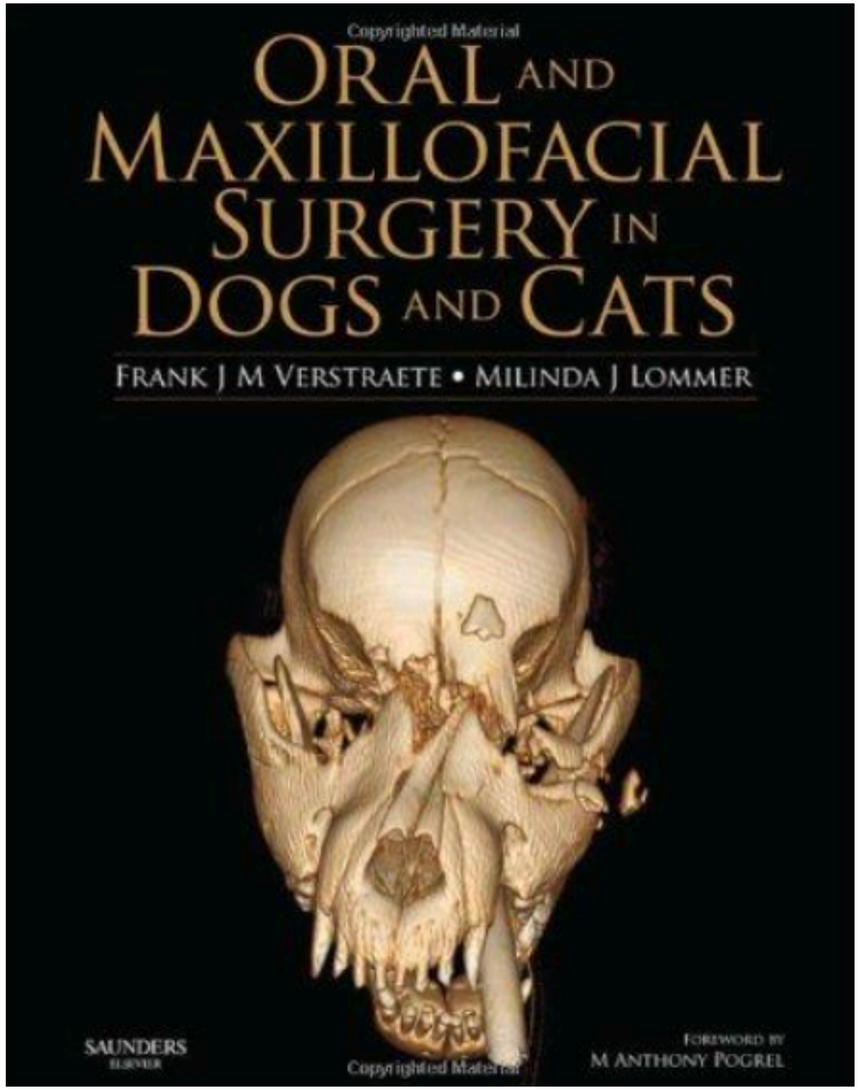


15 d f up

4 m f up

Maxilo-facial





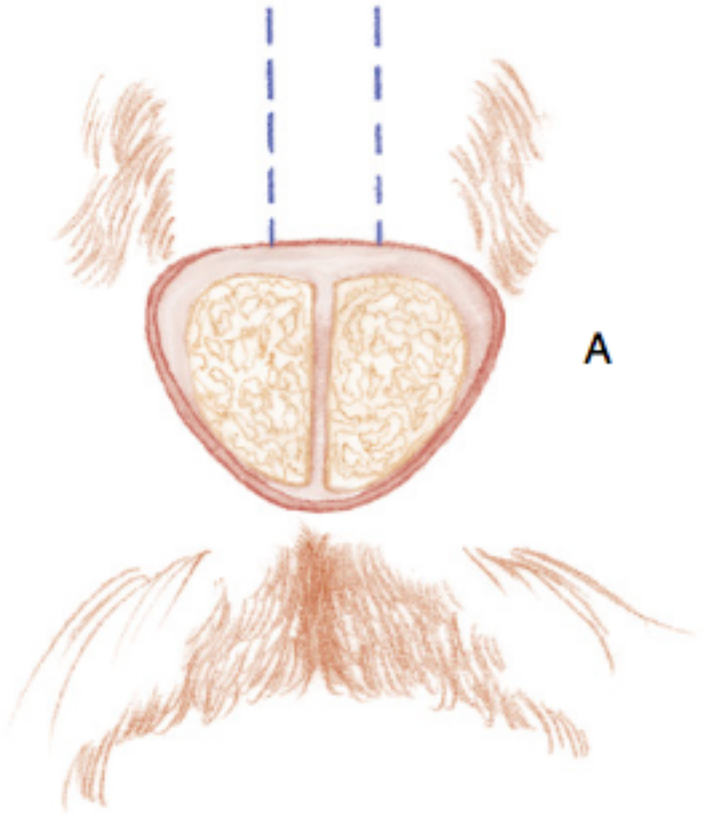
Case 5

Draga

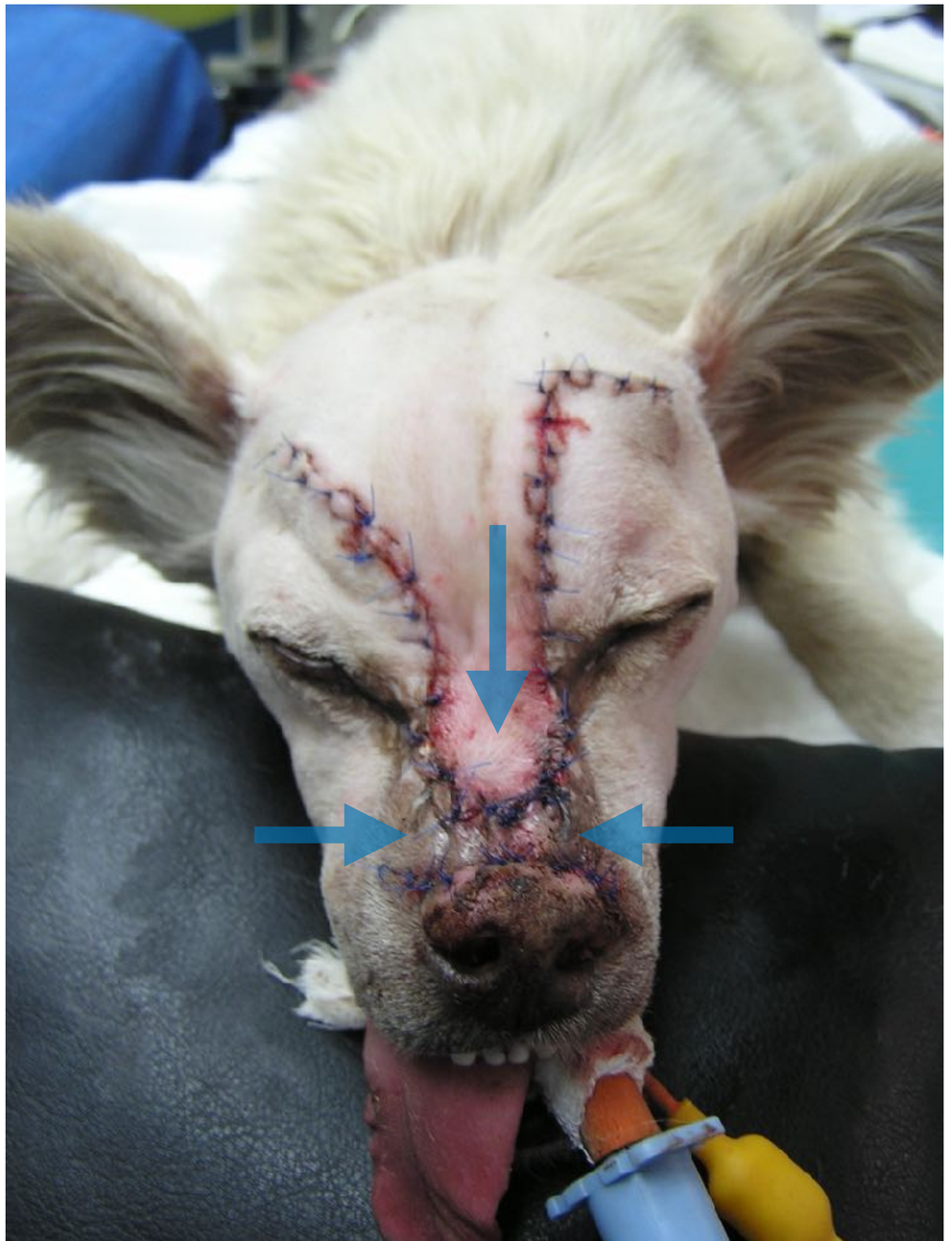
6 y old, mix, female, 5 kg

<u>Aesthetic issues</u>

Severe dorsal nasal skin cicatrix contracture



Post op



14 days f up

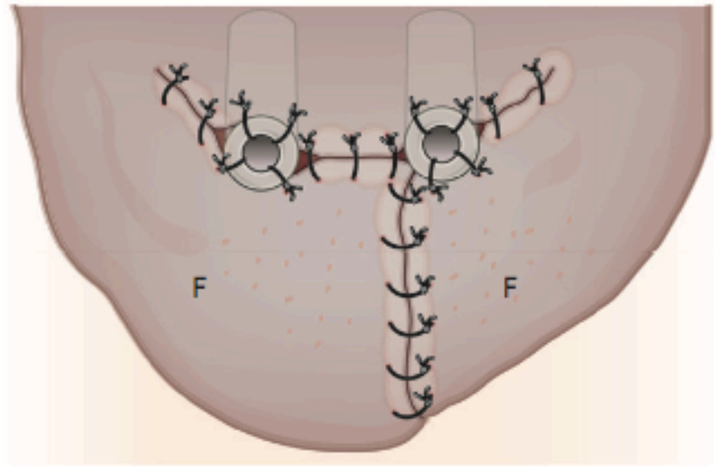
1 y f up

Case 6

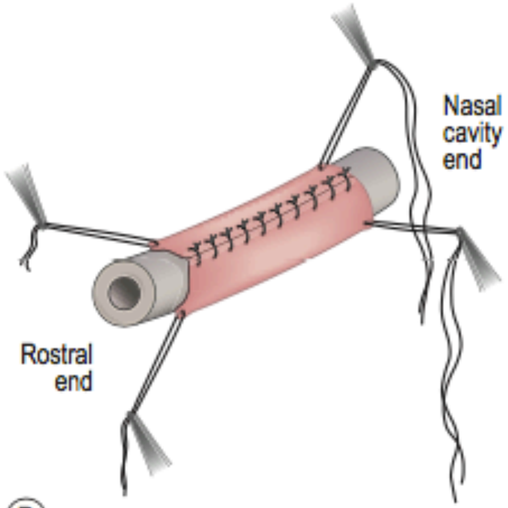
Tipo

- 5 y old, mix, male
- Nostrils bitten off by leopard, one year ago.
- 3 previous surgeries

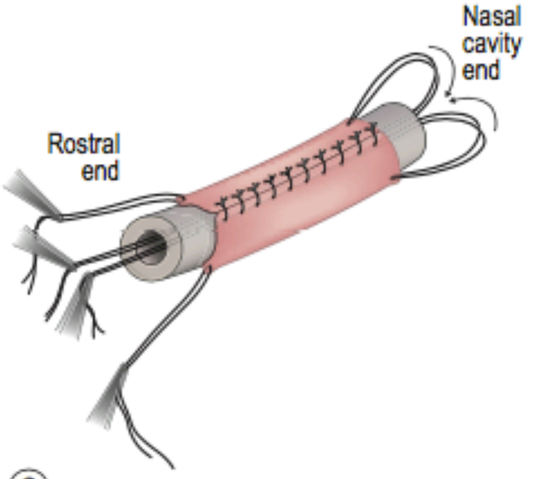
Oral Mucosal Graft with Nasal Stenting



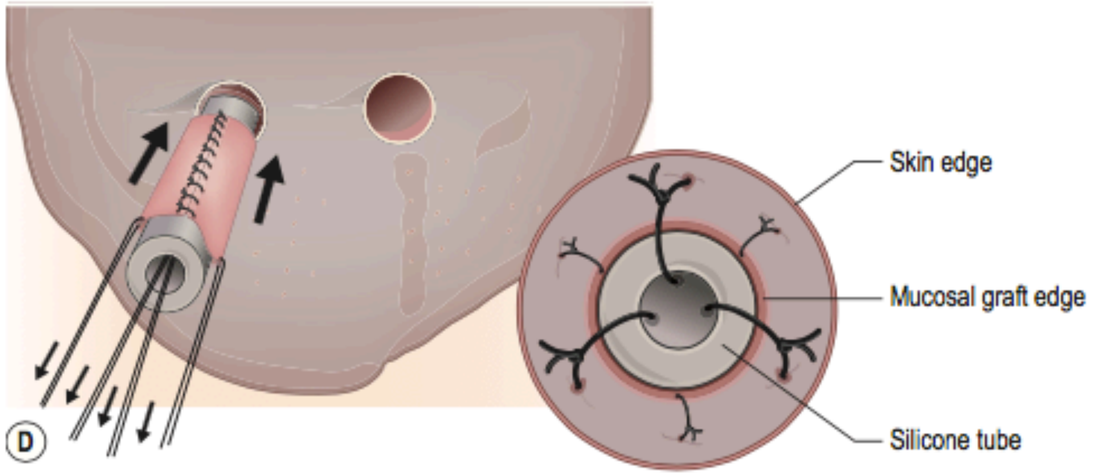
A



B

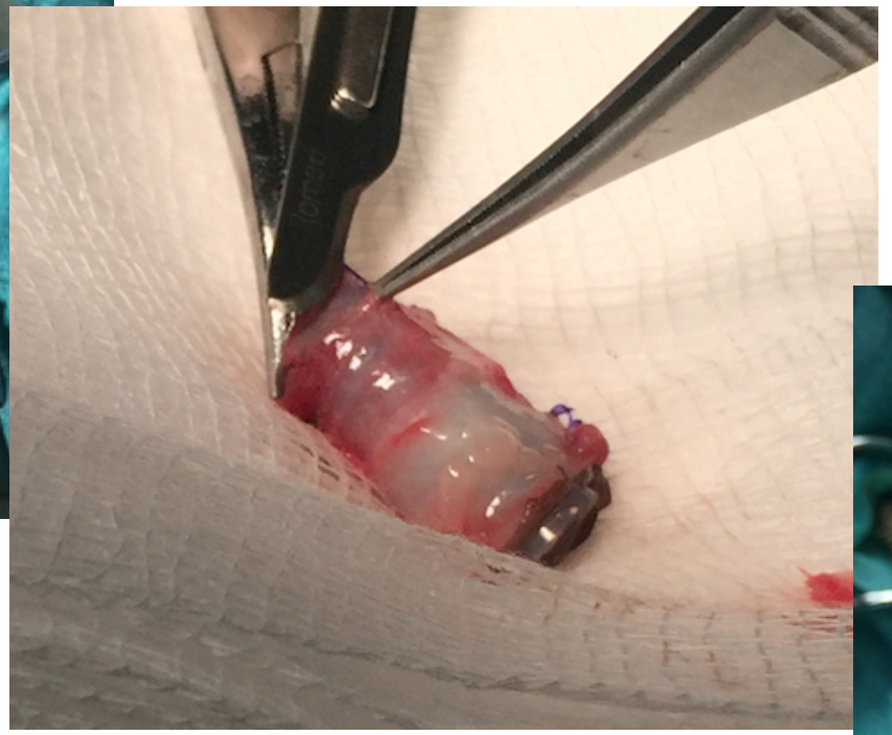


C



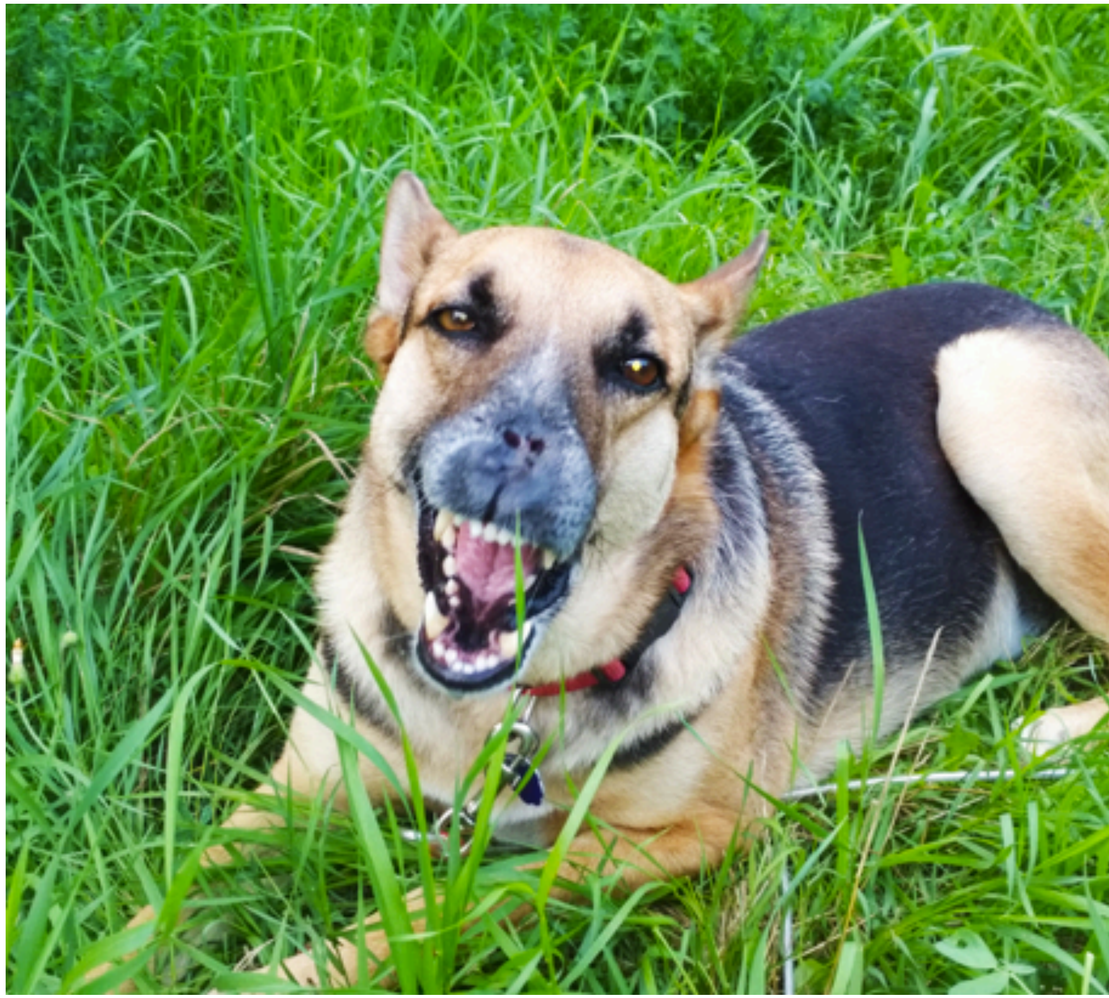
D

E



6 weeks f up

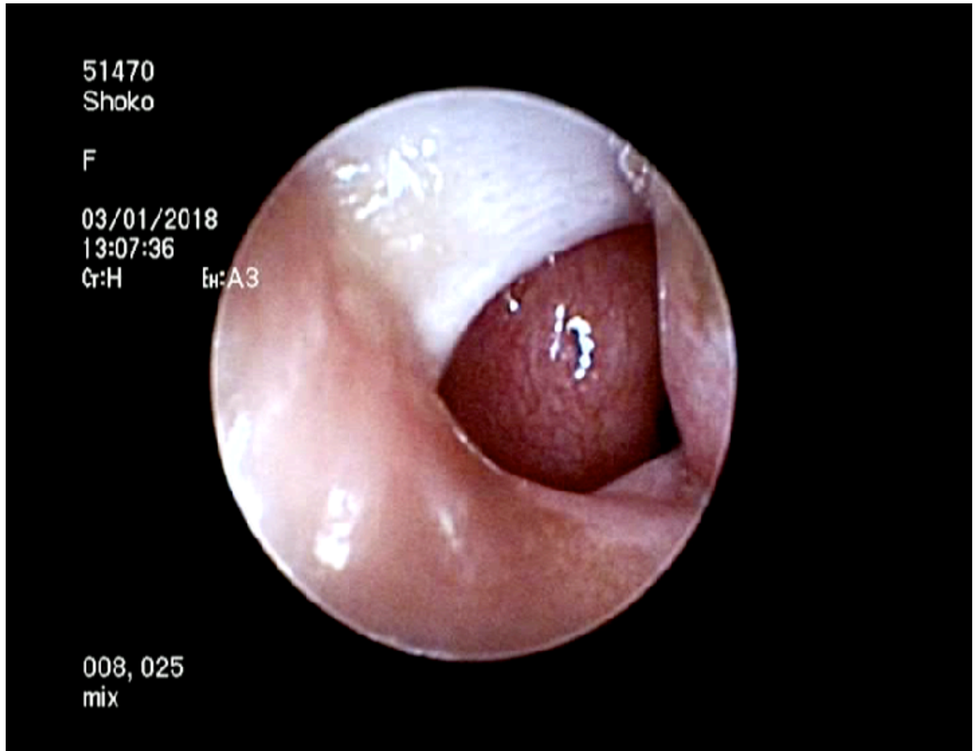
6 months f up

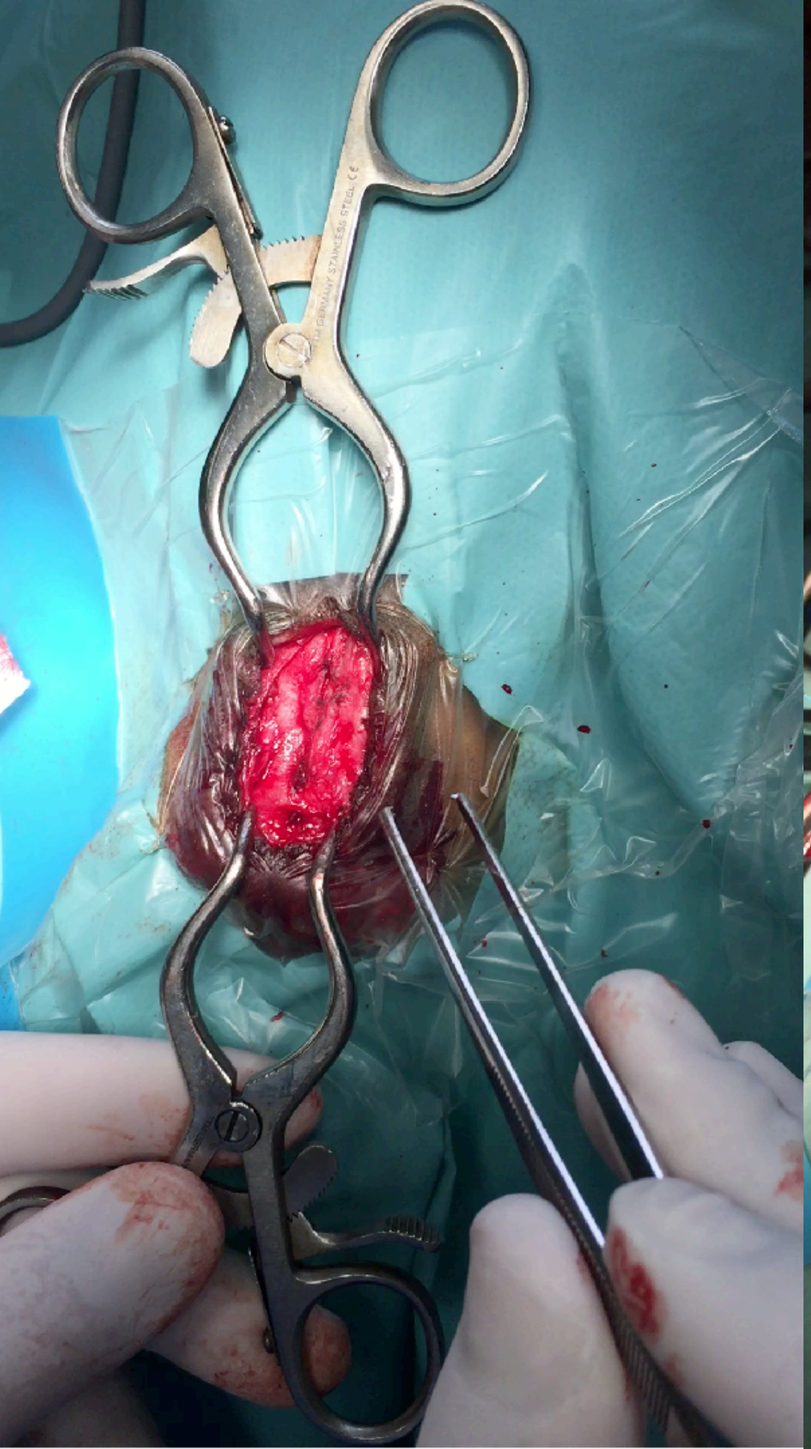
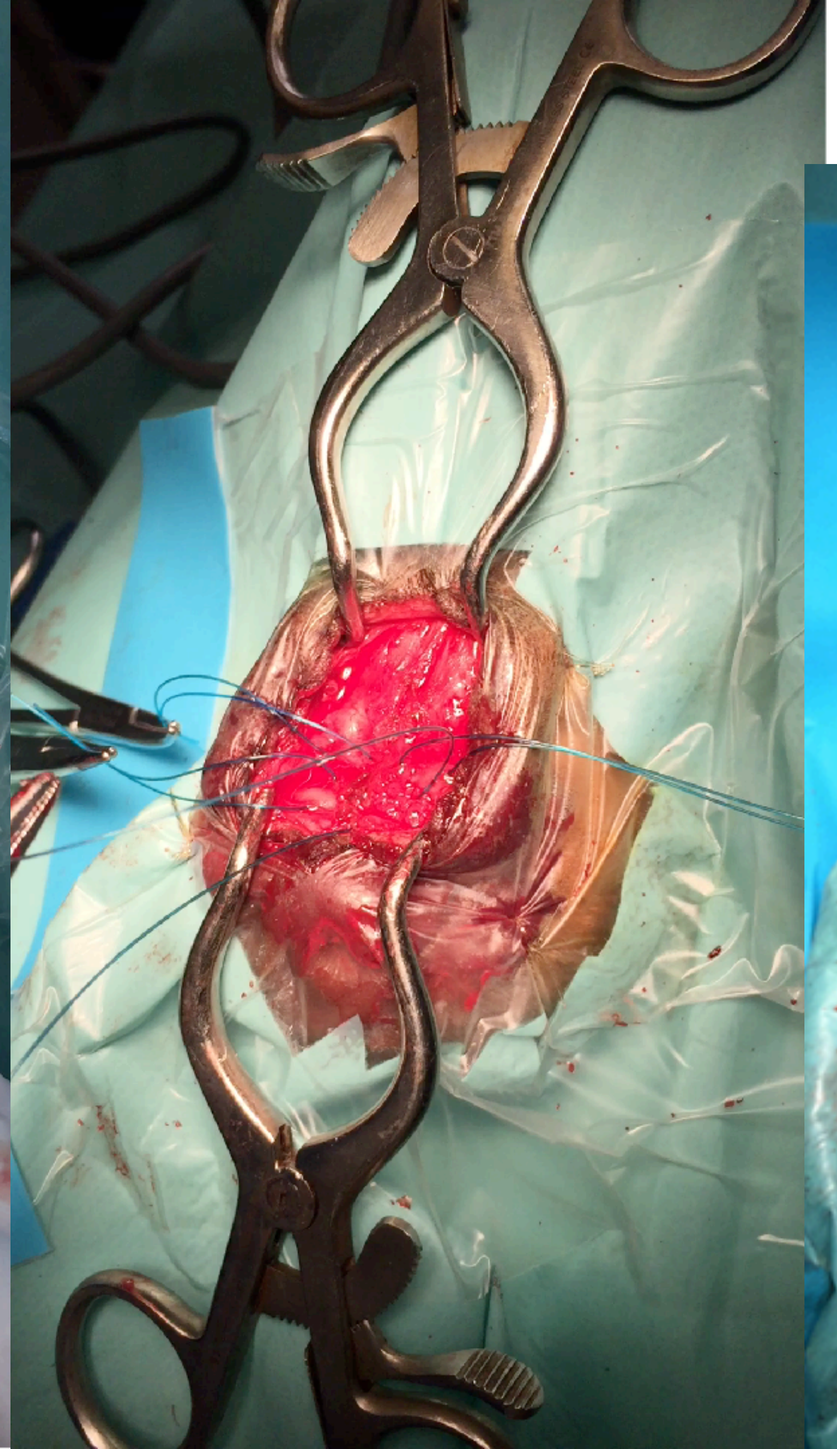
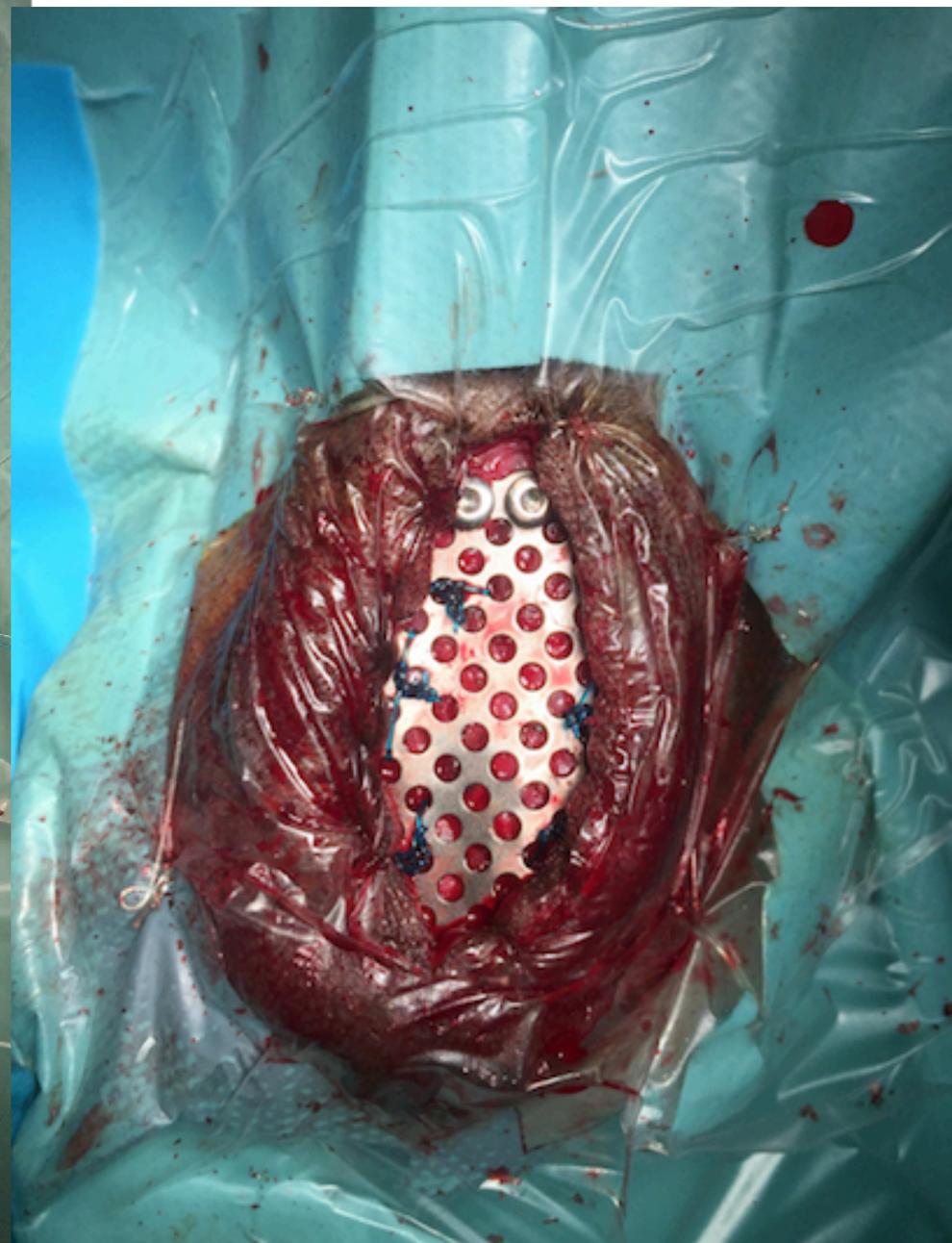


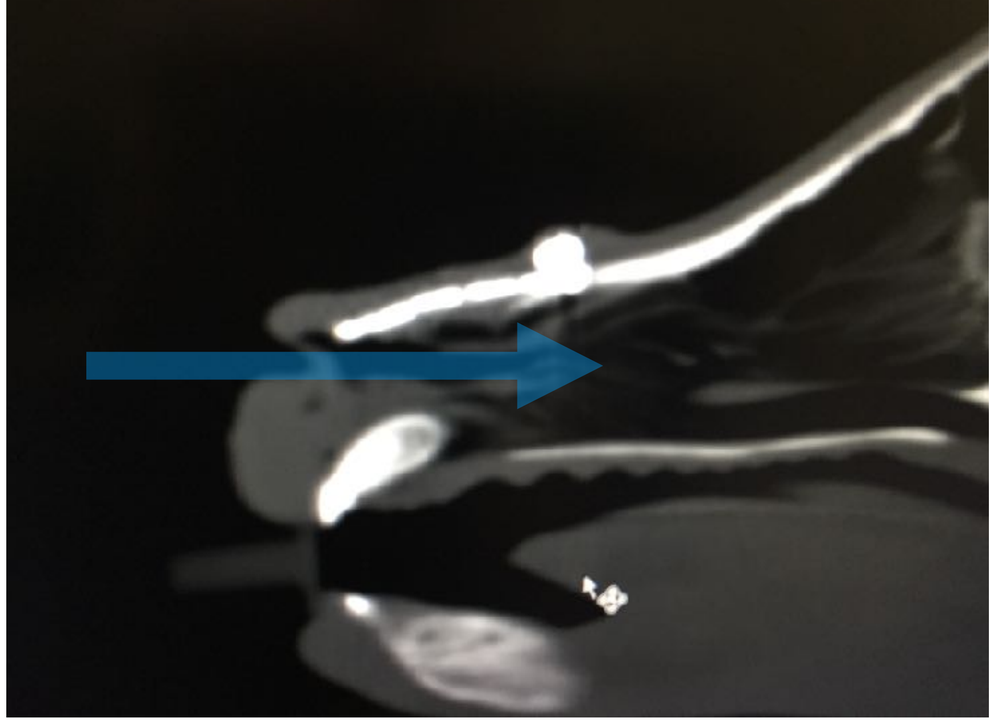
Case 7

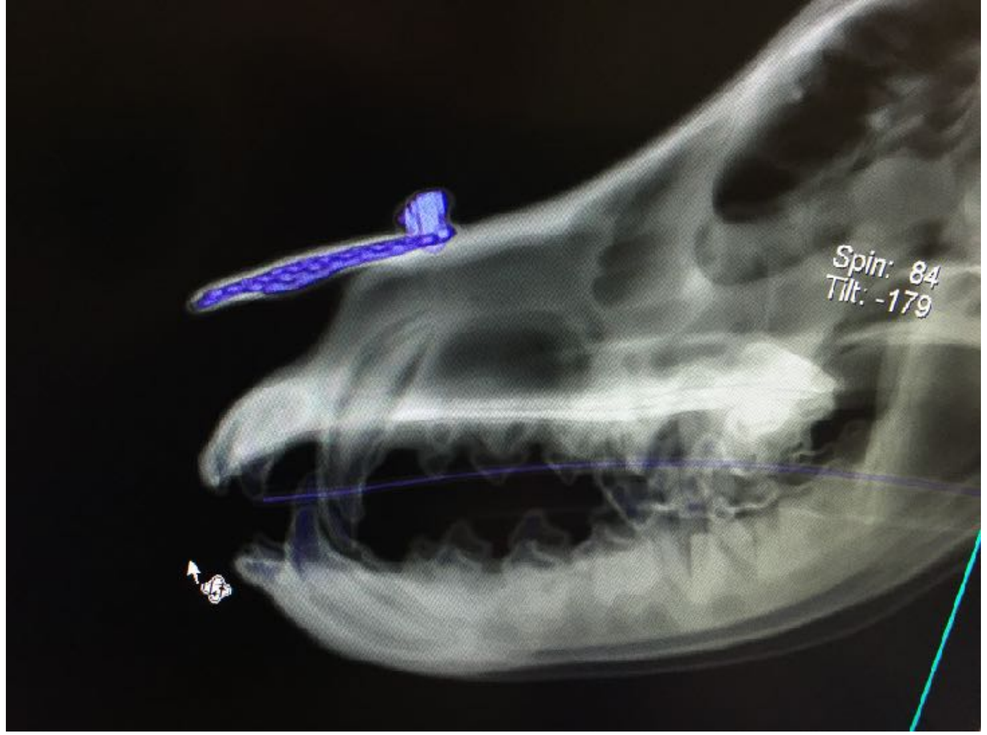
Shoko

- 7m old, mix, female
- Difficult breathing , inspiratory effort
- Congenital alar cartilage defect






Spin: 84
Tilt: -179


Spin:
Tilt: 17

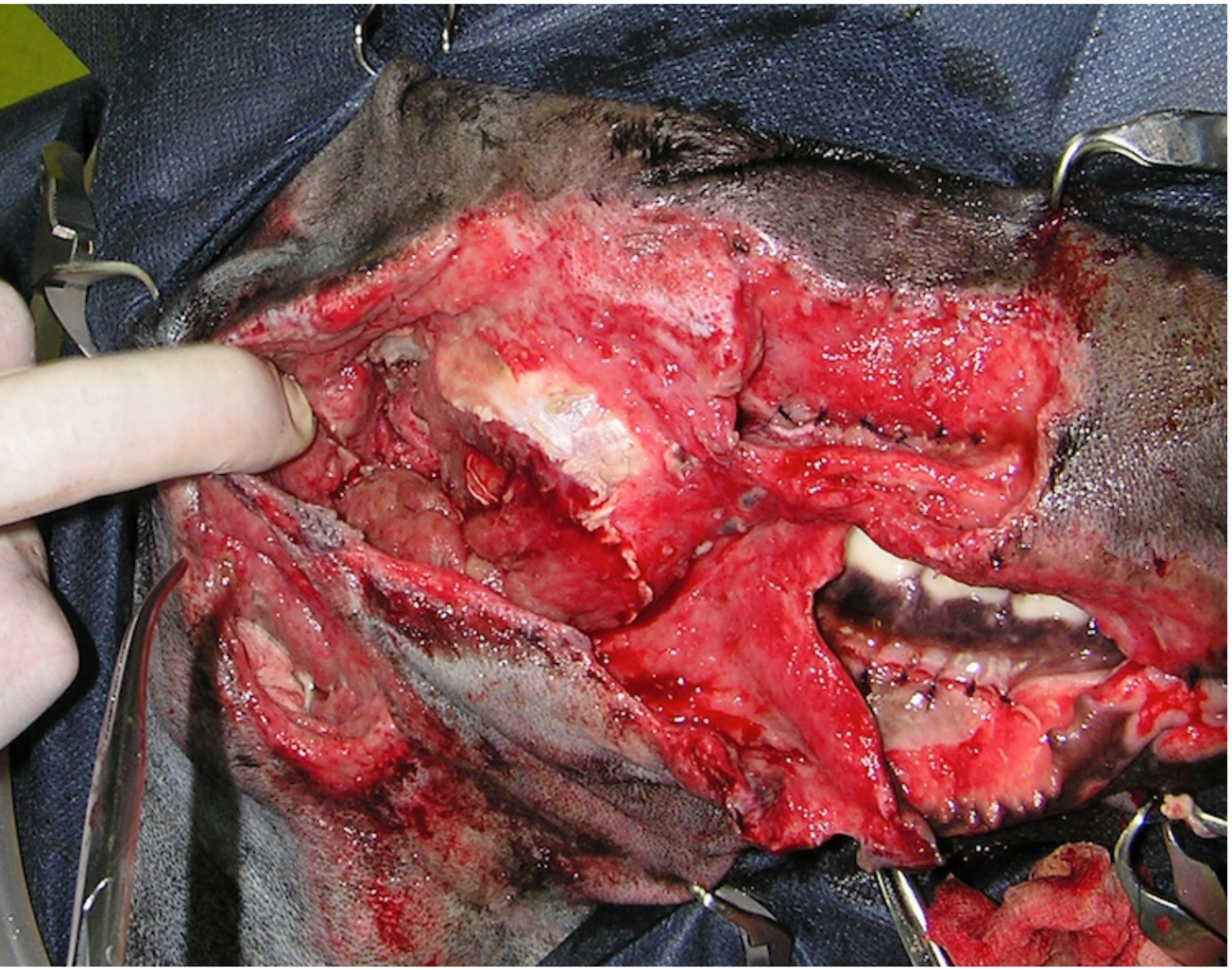
Case 8

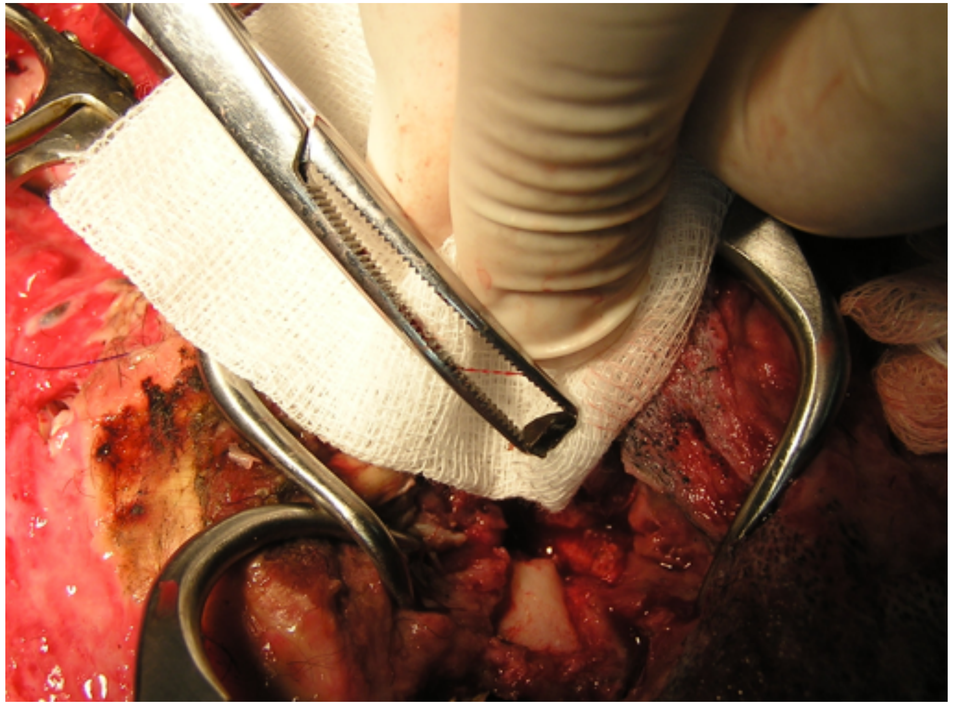
Winnie

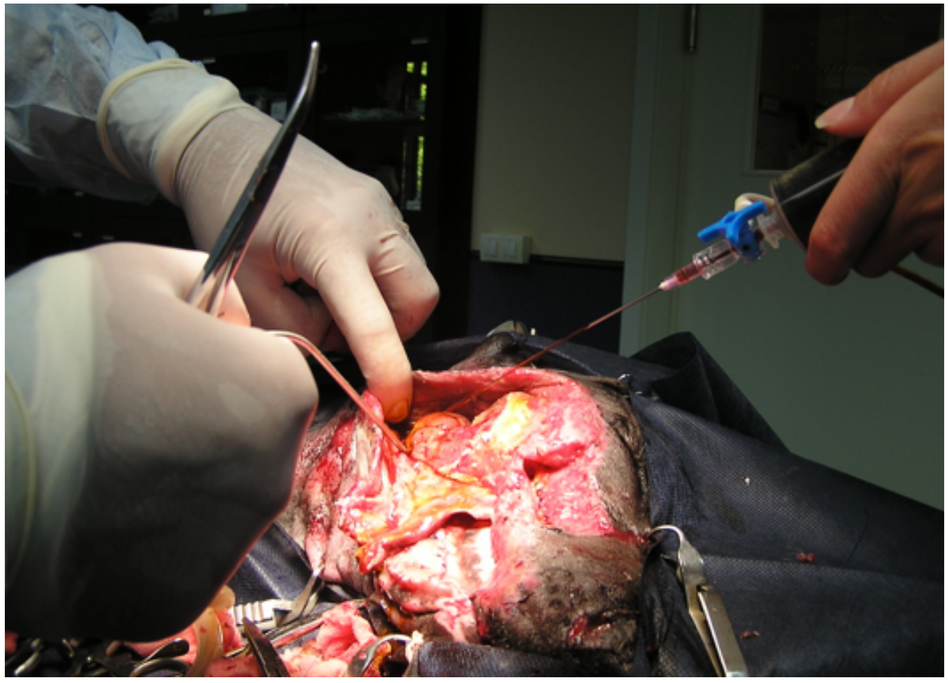
- 1y old, female mix, 23 kg
- Found on the street- severe head trauma

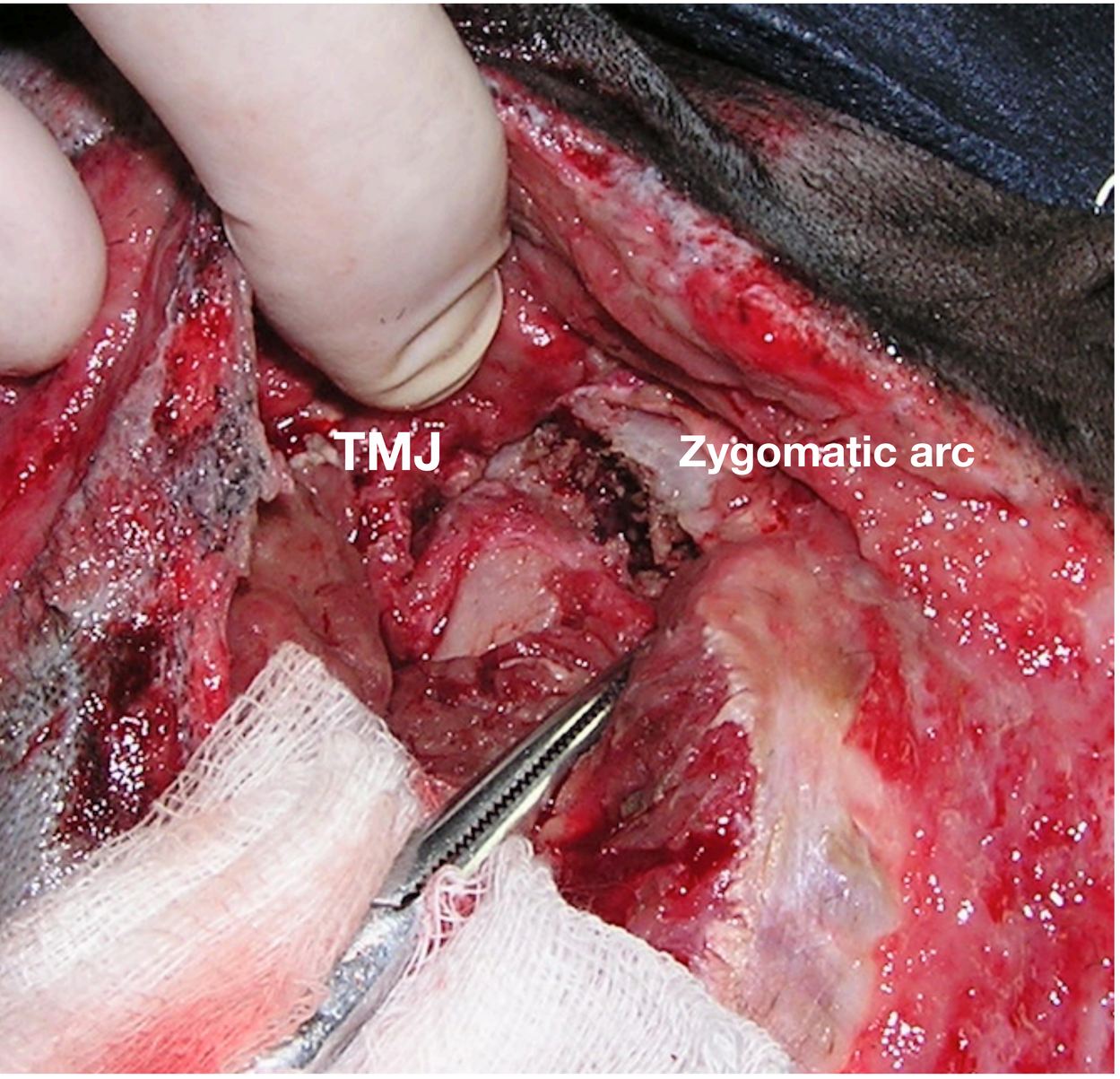
Shearing injury ?

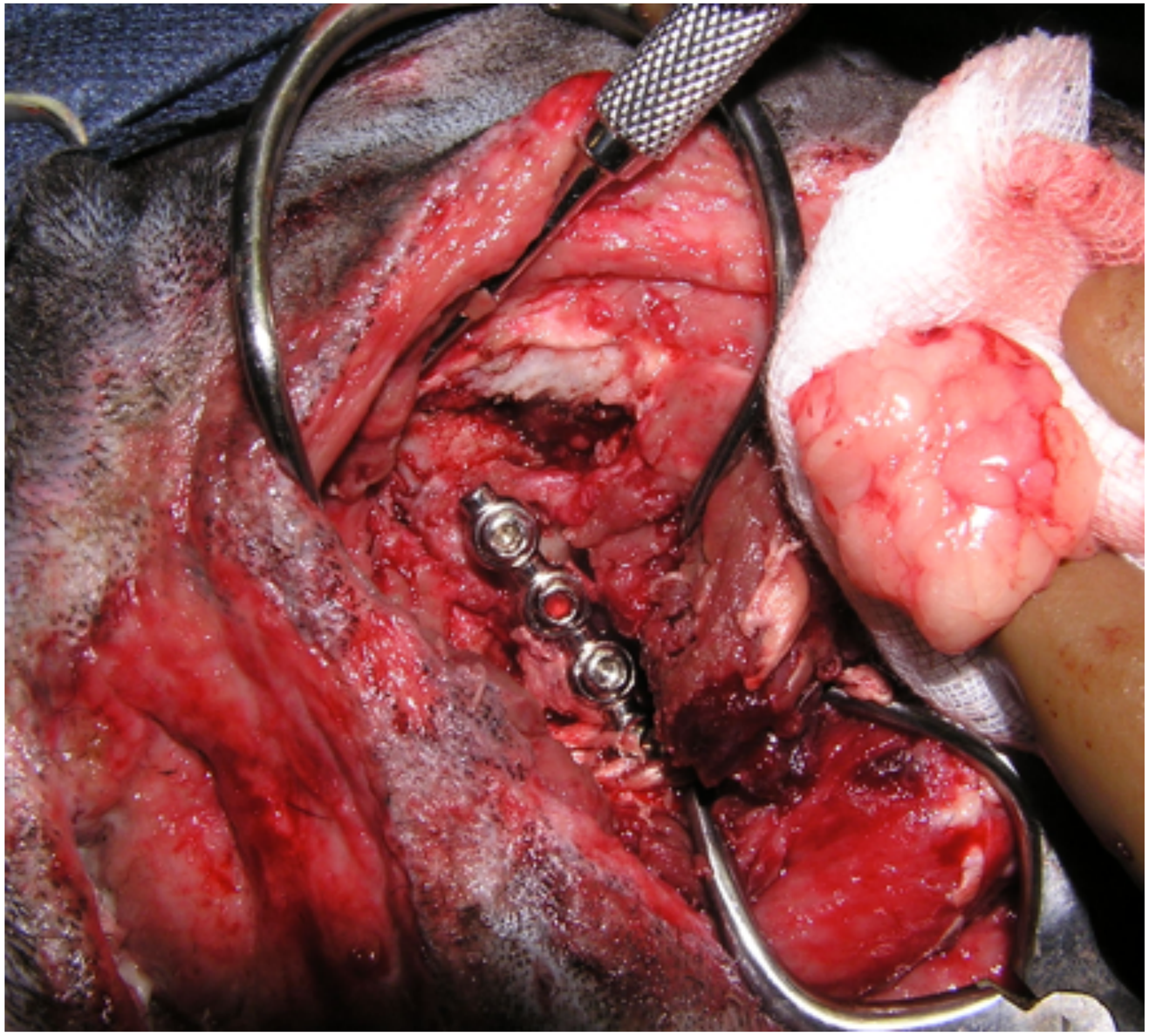

R

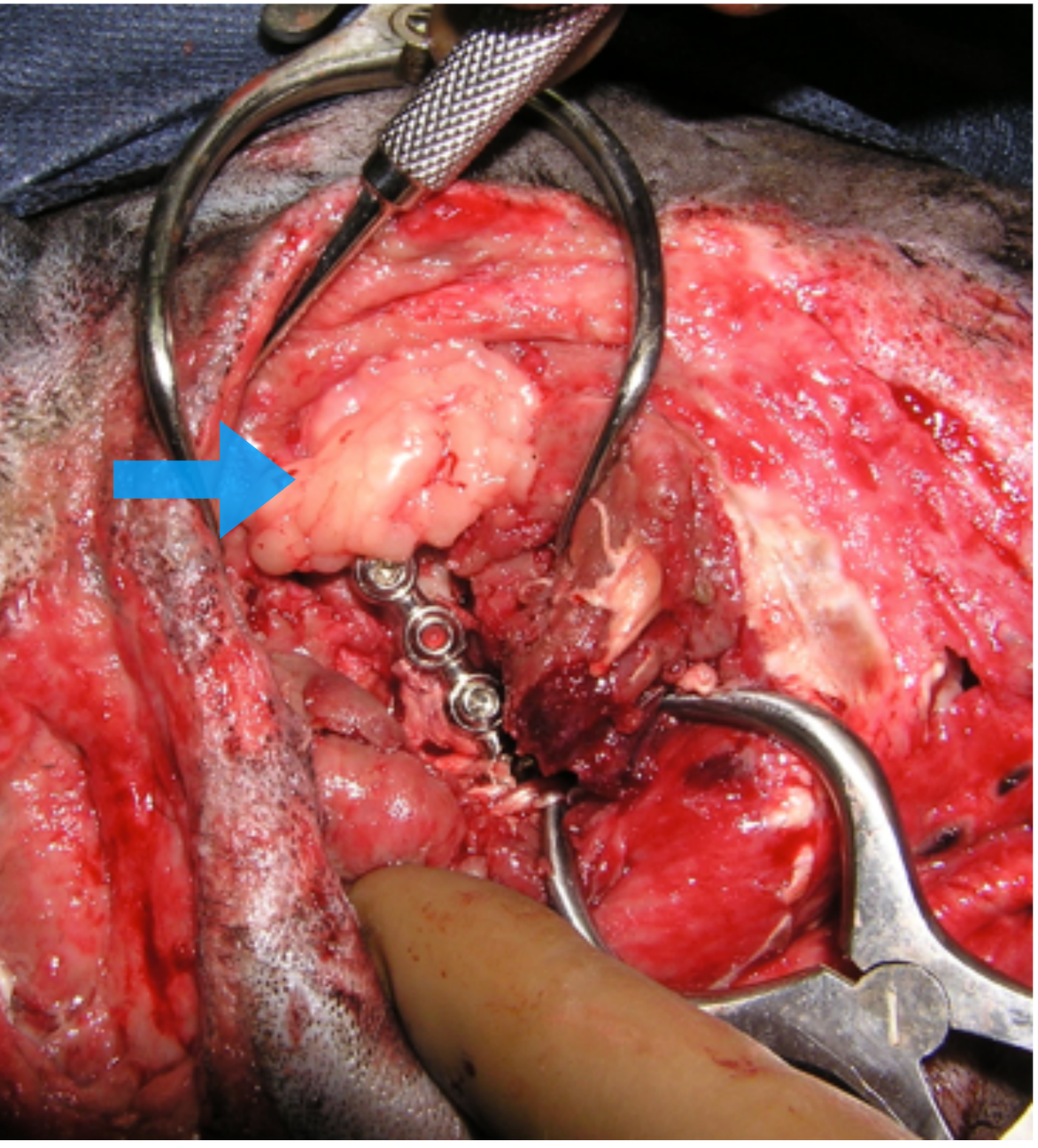


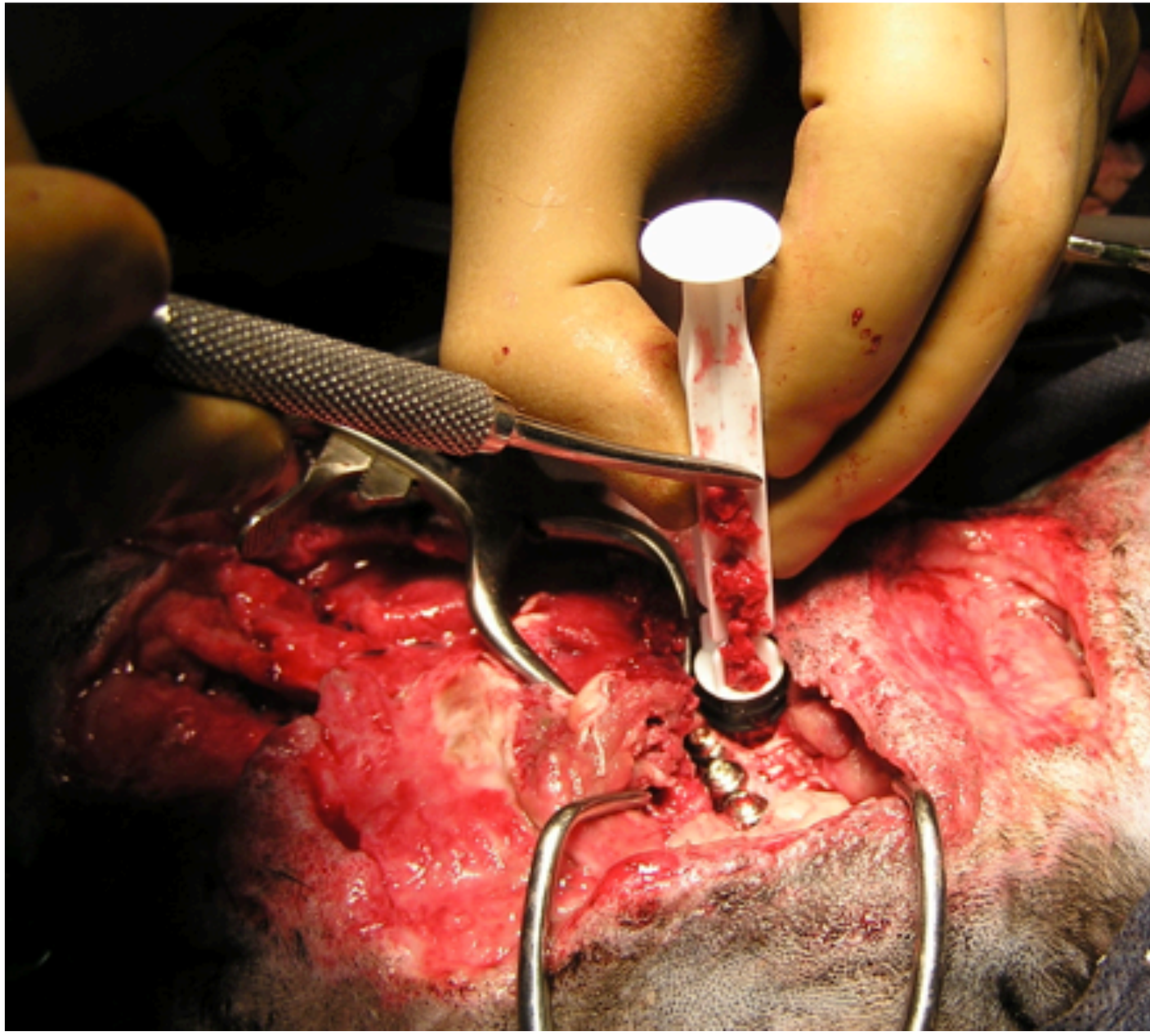





TMJ
Zygomatic arc



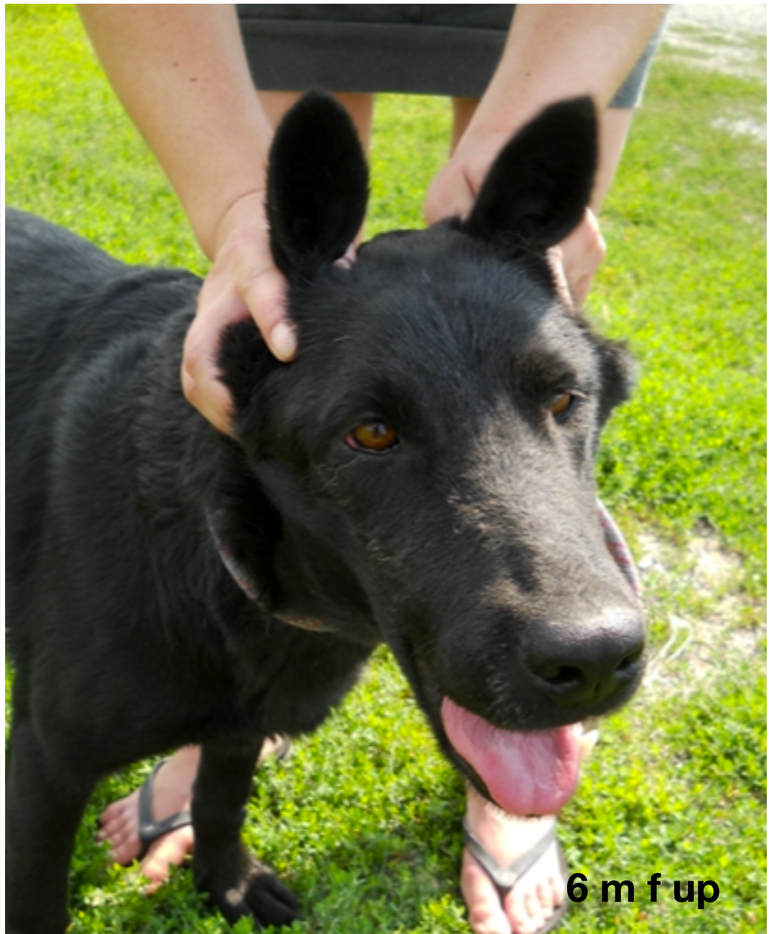





Post op


23 d f up


60 d f up


6 m f up

Complex limb defects

Case 9

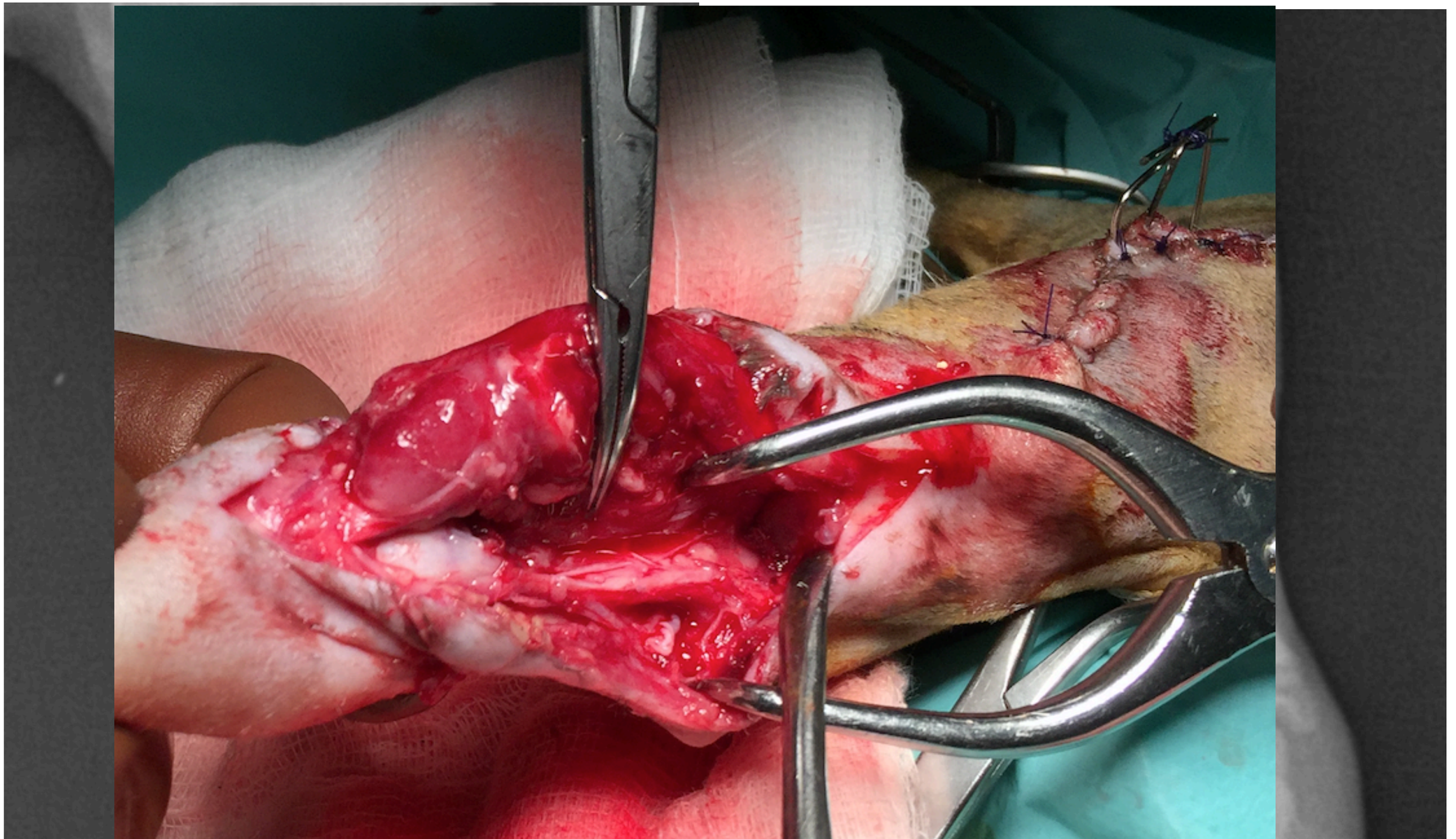
Mono

- 3,5 m old, kitten, 850 g
- Found on the street- severe hind leg trauma
- Amputation suggested

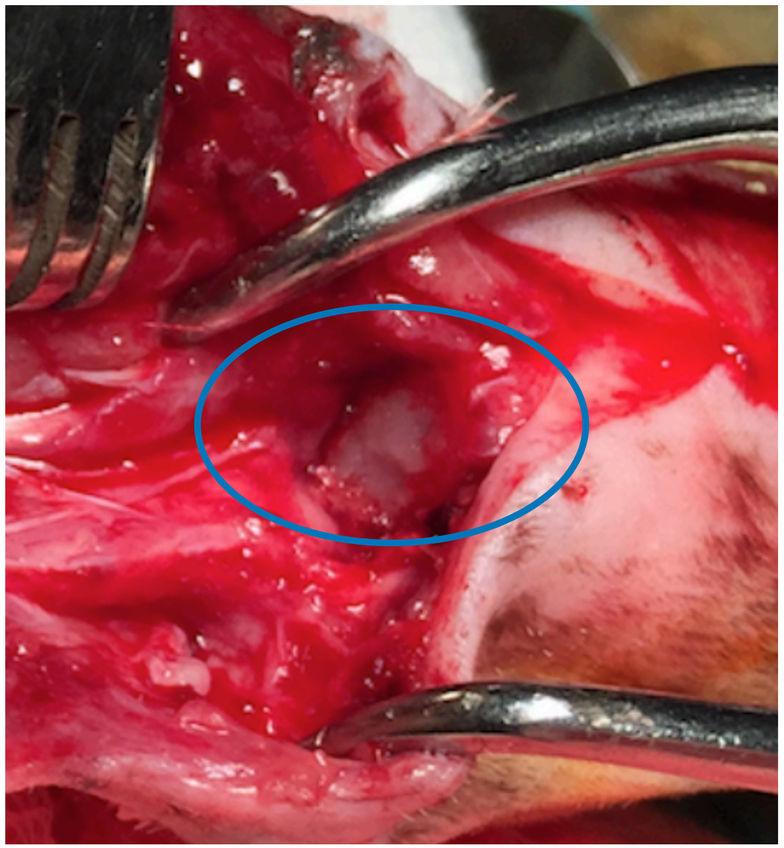
- Soft tissue loss
- Circular “Cuff” compression

Bone fractures

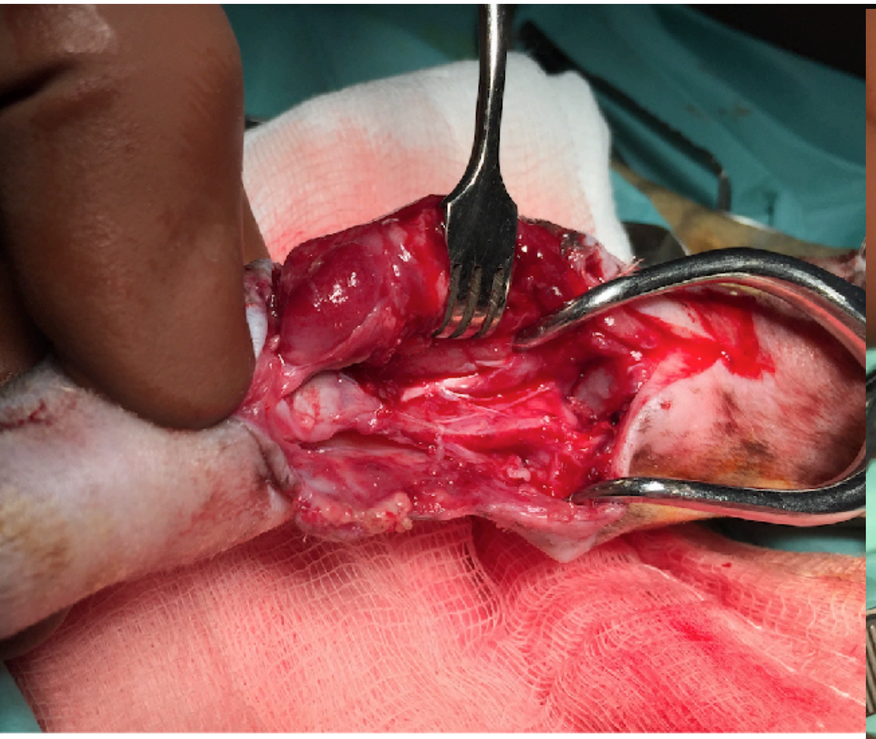
DEVASTATING bone loss

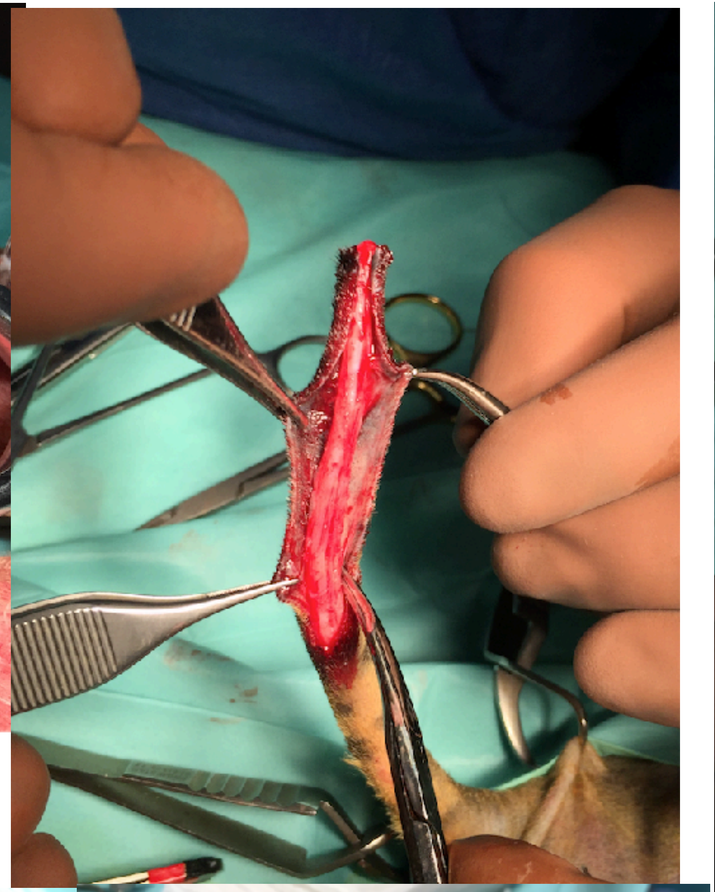


- Treatment plan?
- Implants?
- How many surgeries?

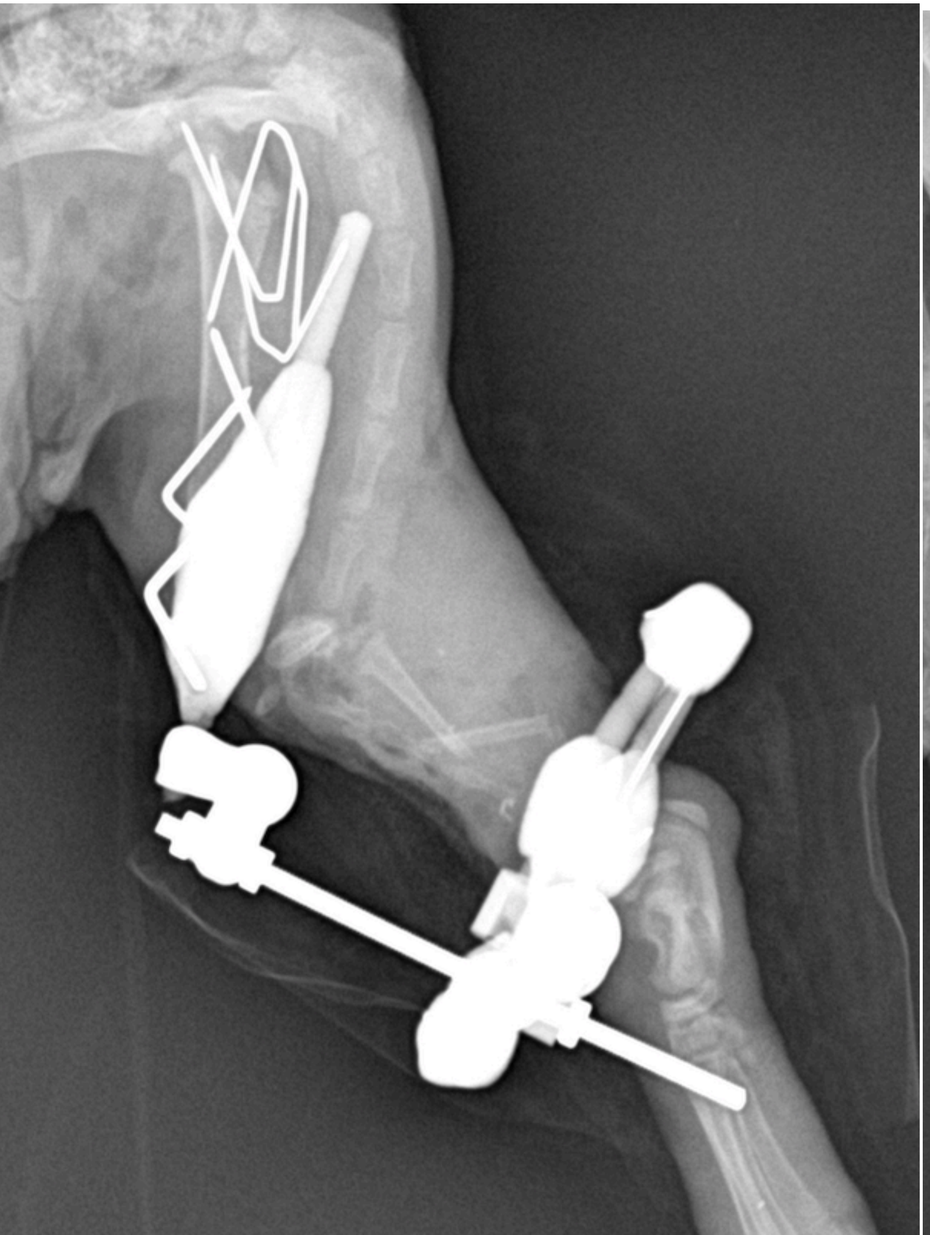


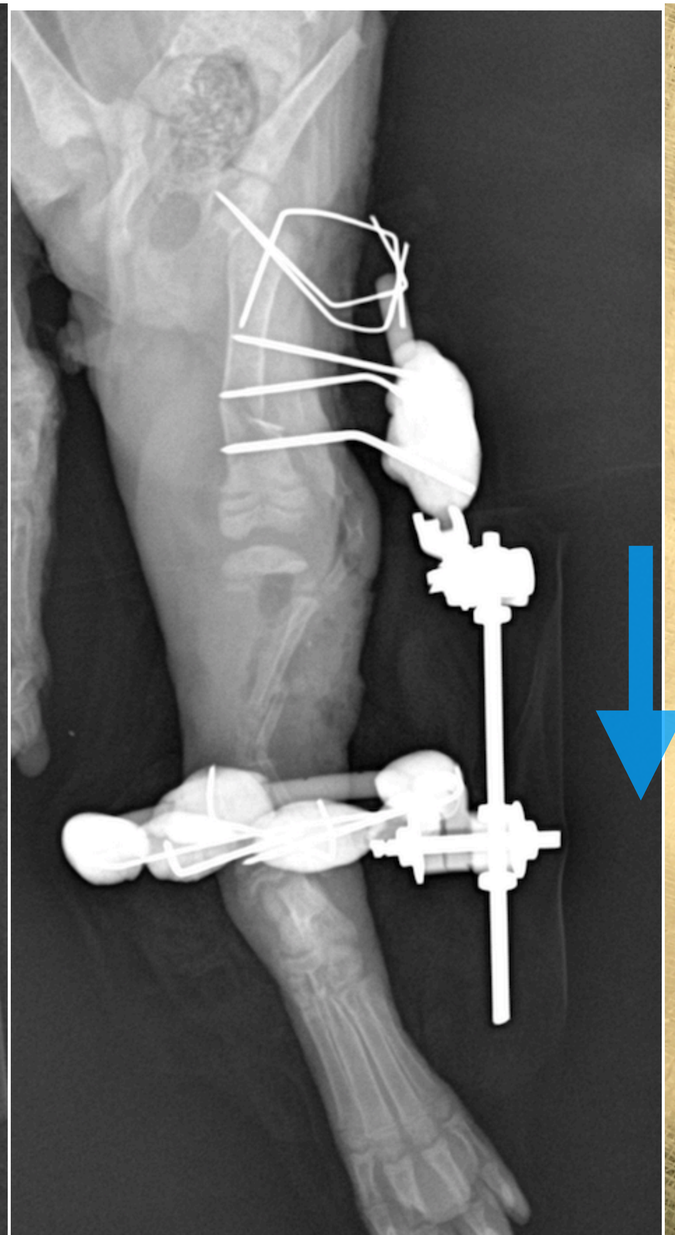
“Axial distant full organ tail flap”

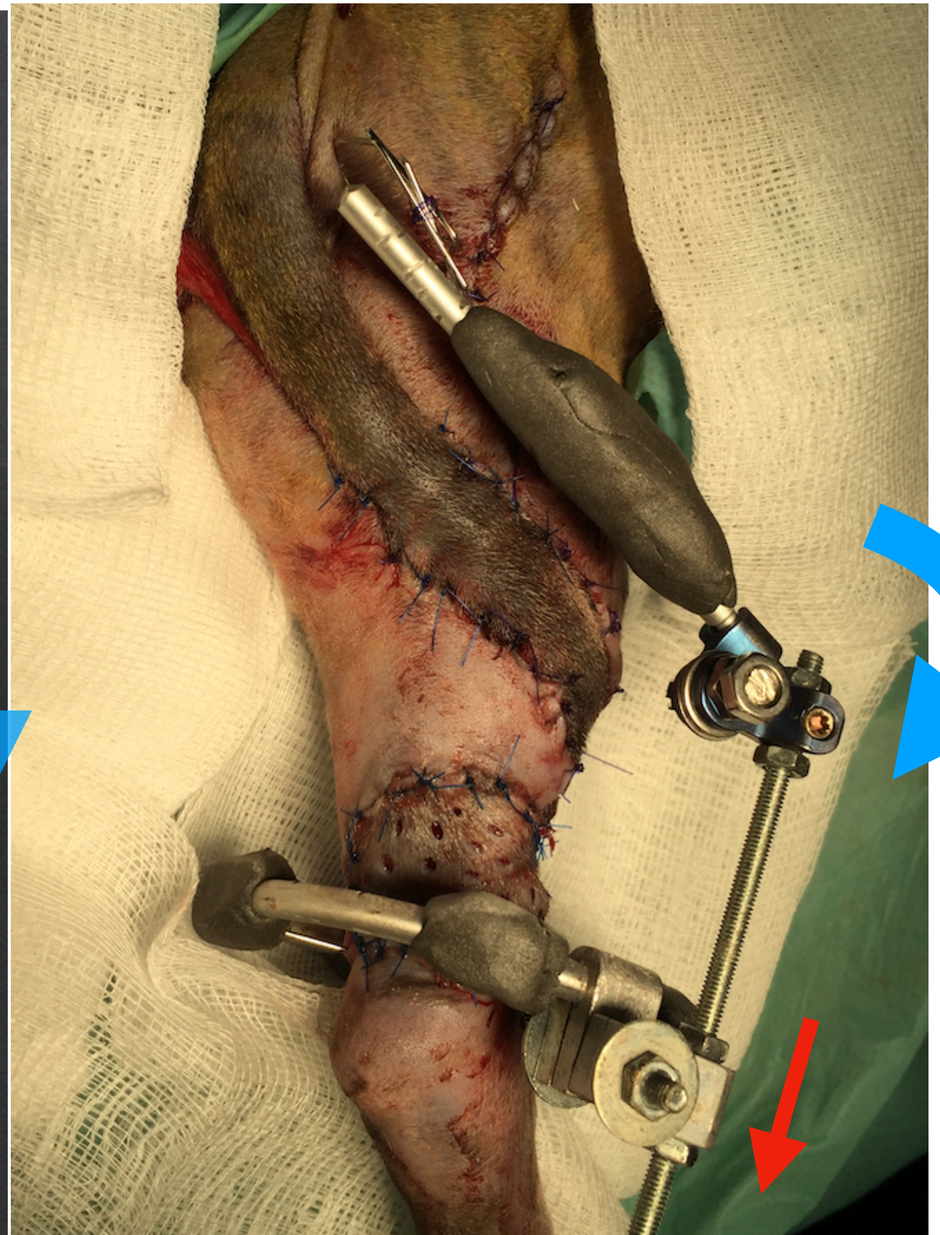




Transarticular ESF, hinged, dynamic distraction







10 days follow up

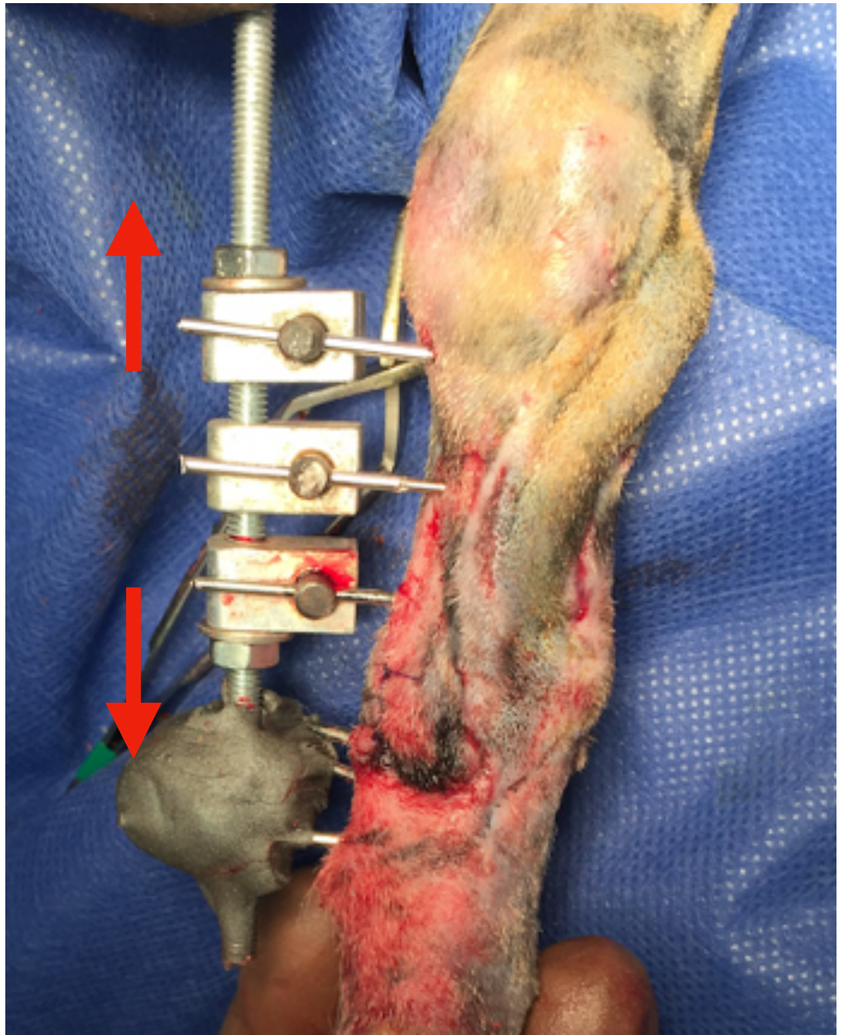
Hinge-temporary blocked

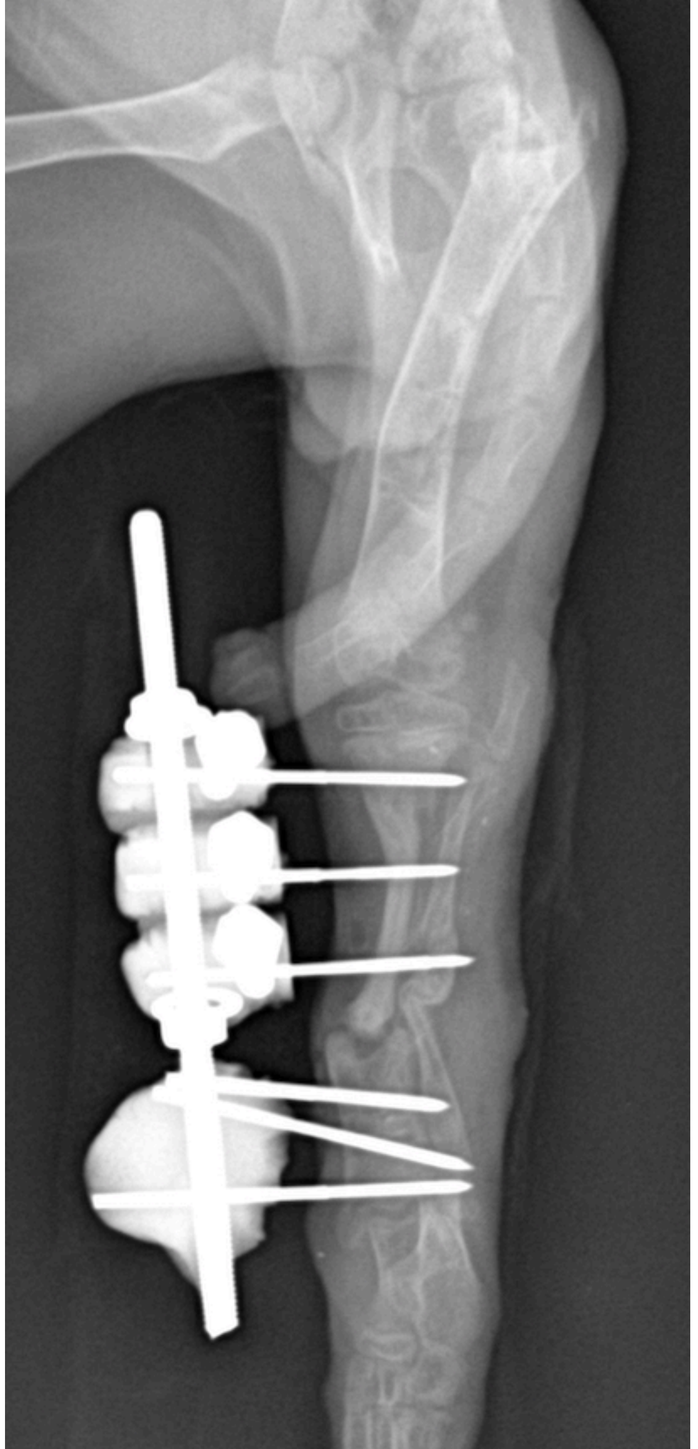
21 days follow up

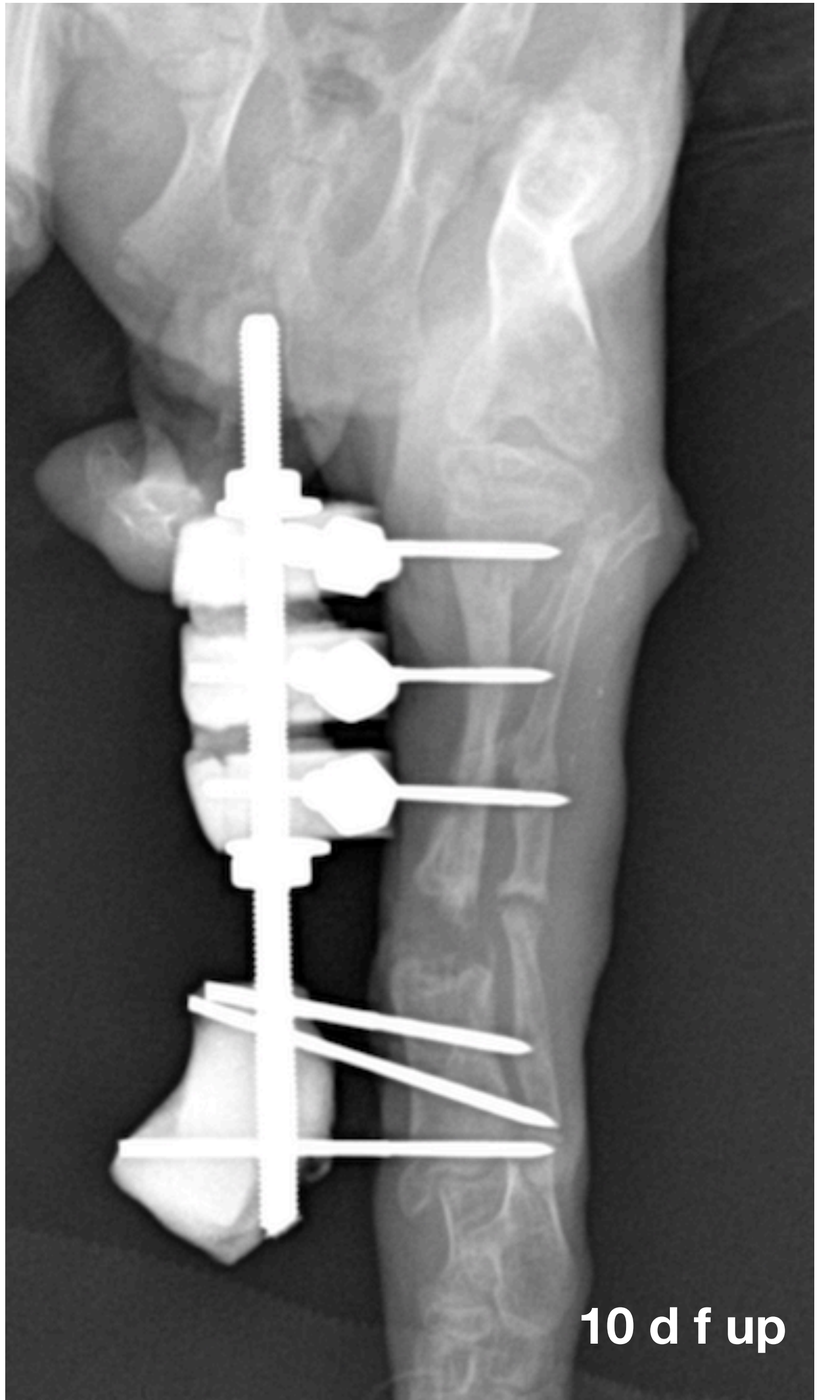
<4 m of age

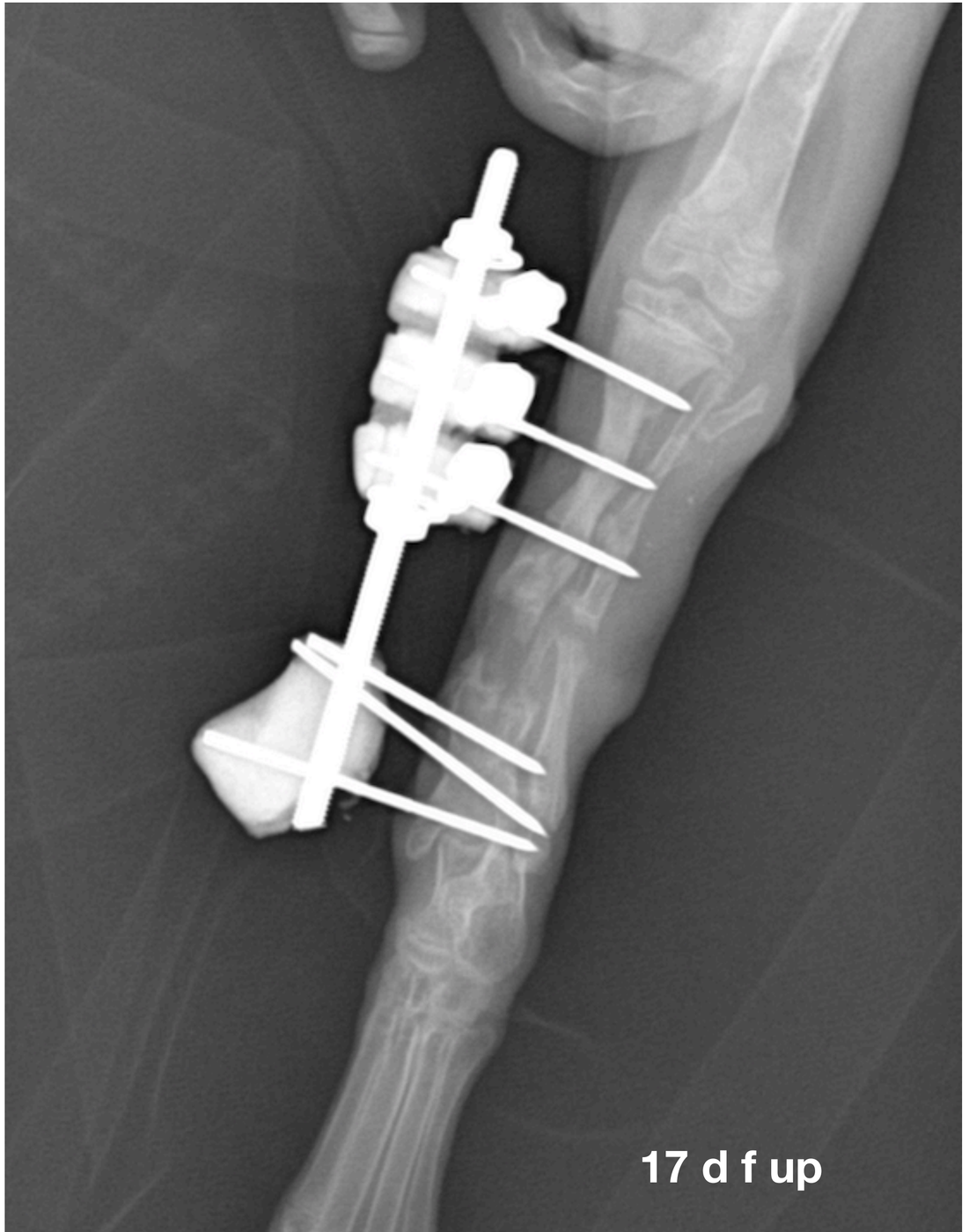
What's next?

Distraction osteogenesis- linear device

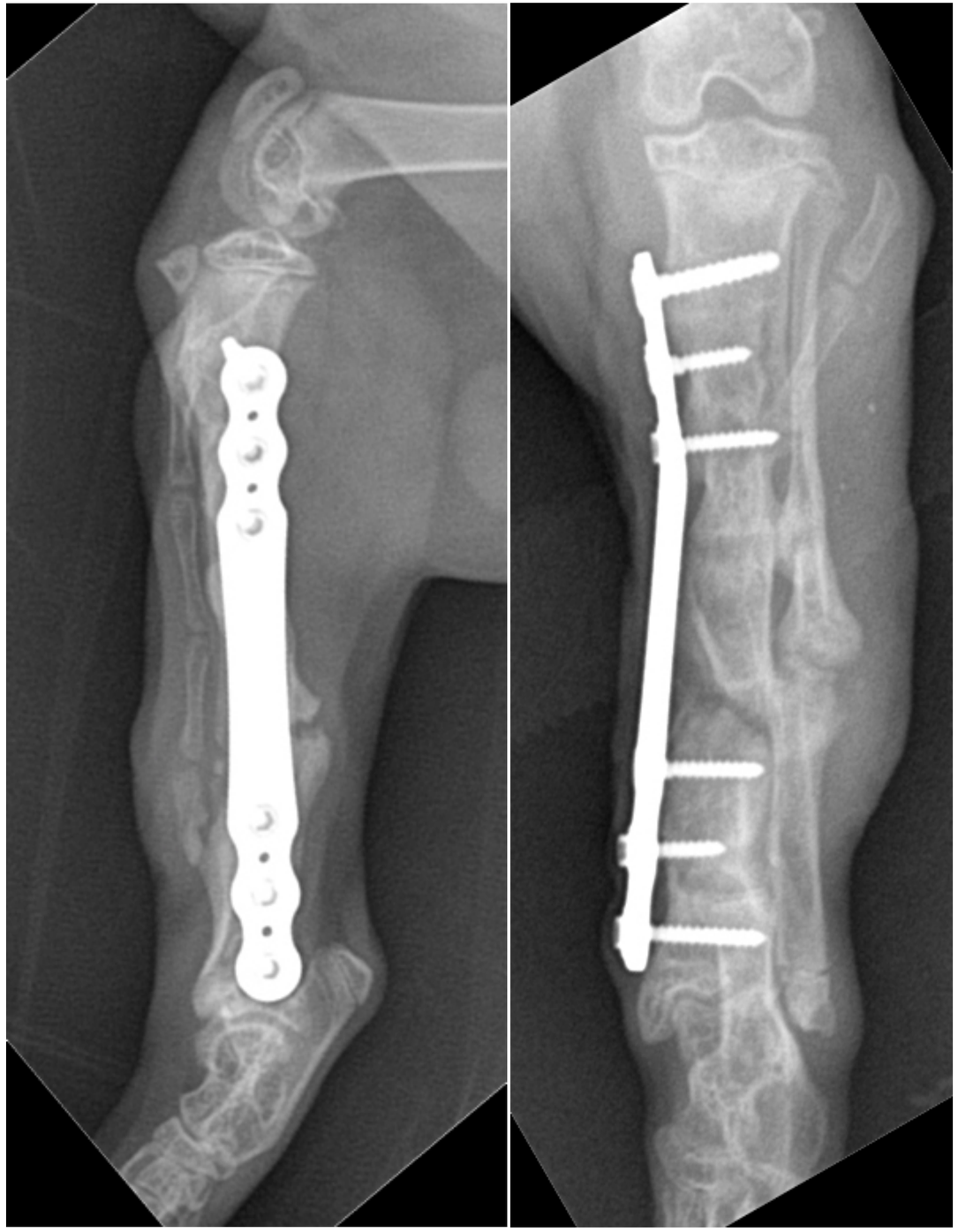





10 d f up


17 d f up

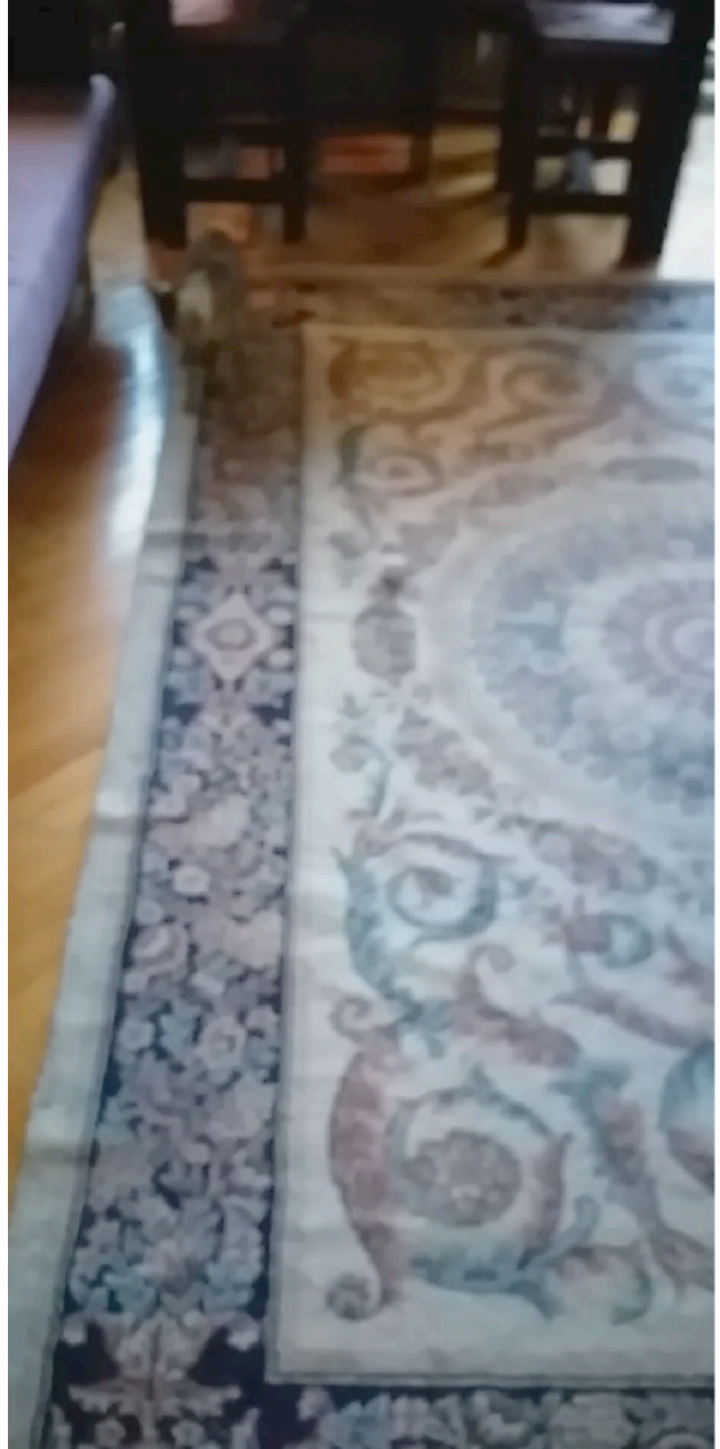
27 days follow up



2 m f up

4 m f up

3,2 kg

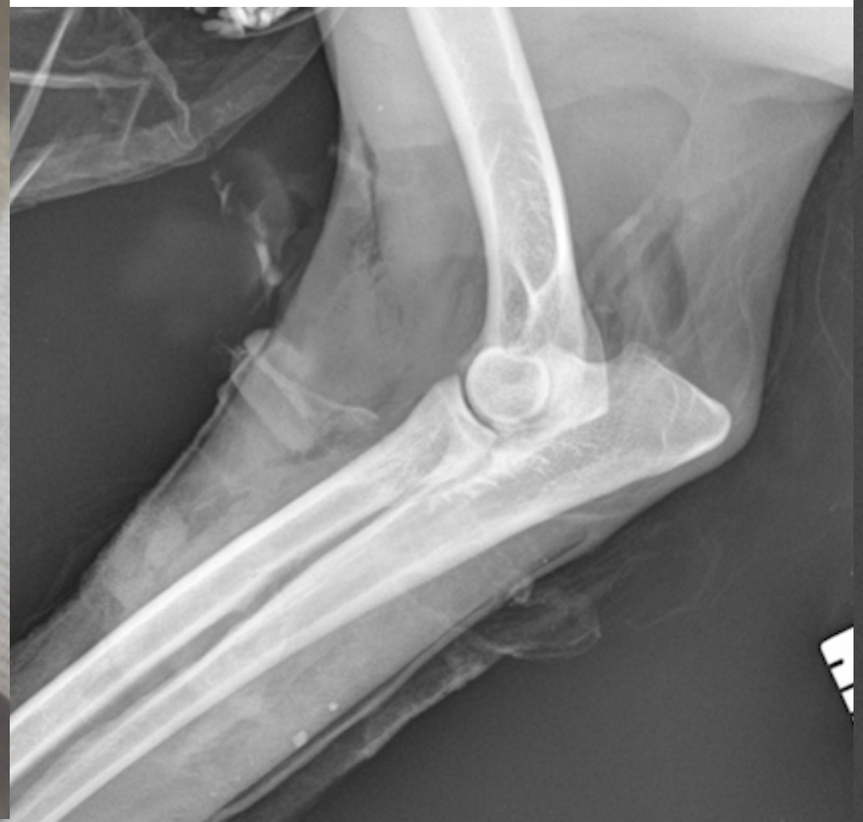


Case 10

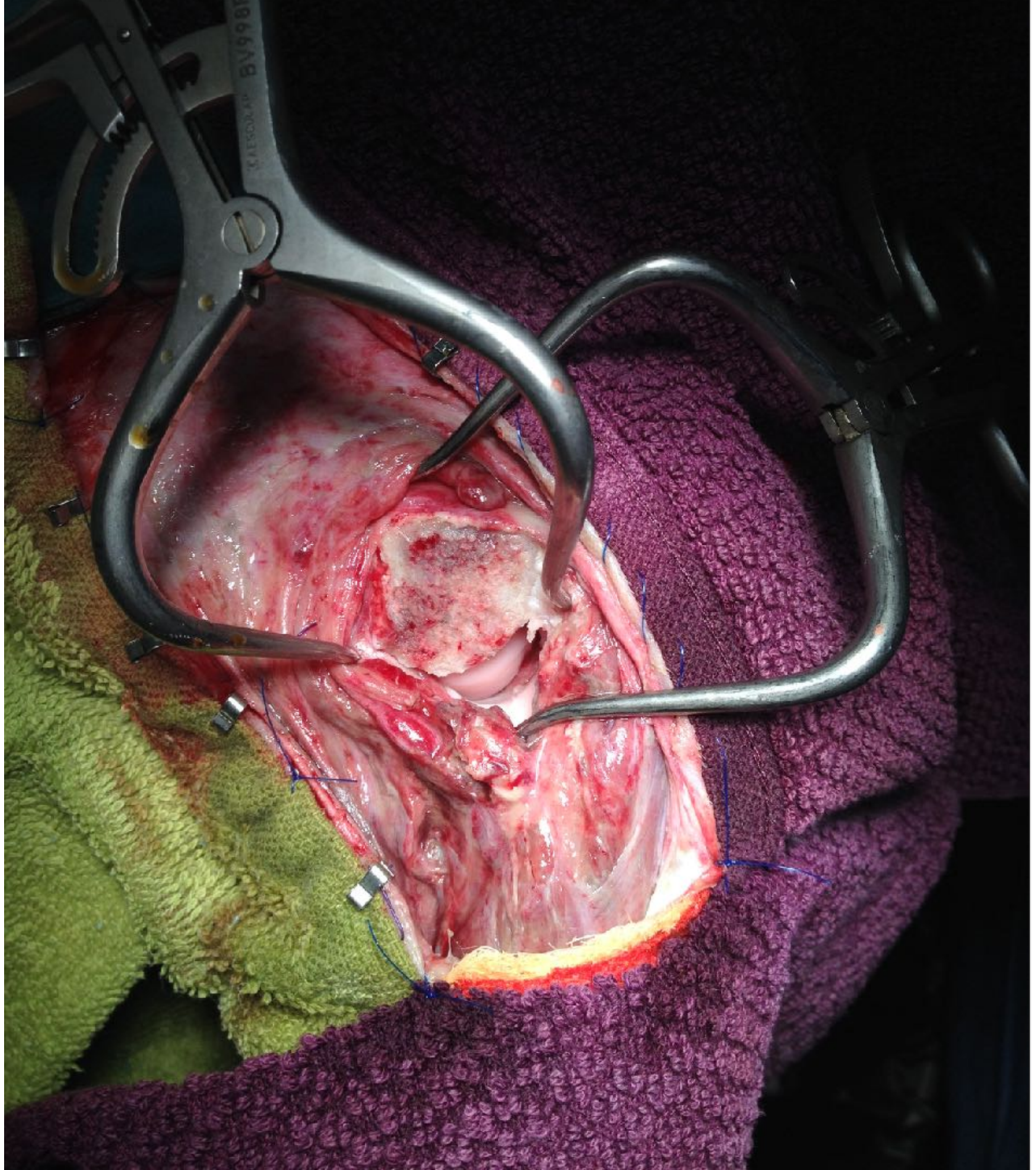
Winnie

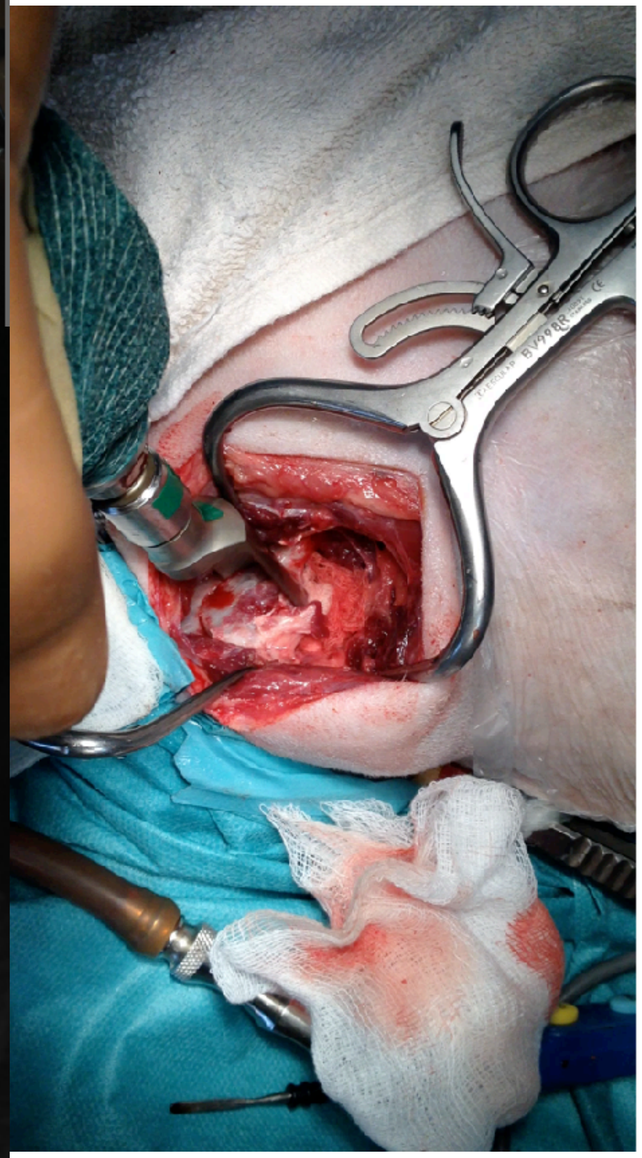
- 5y old,samoyed, 23 kg
- HBC, shearing injury

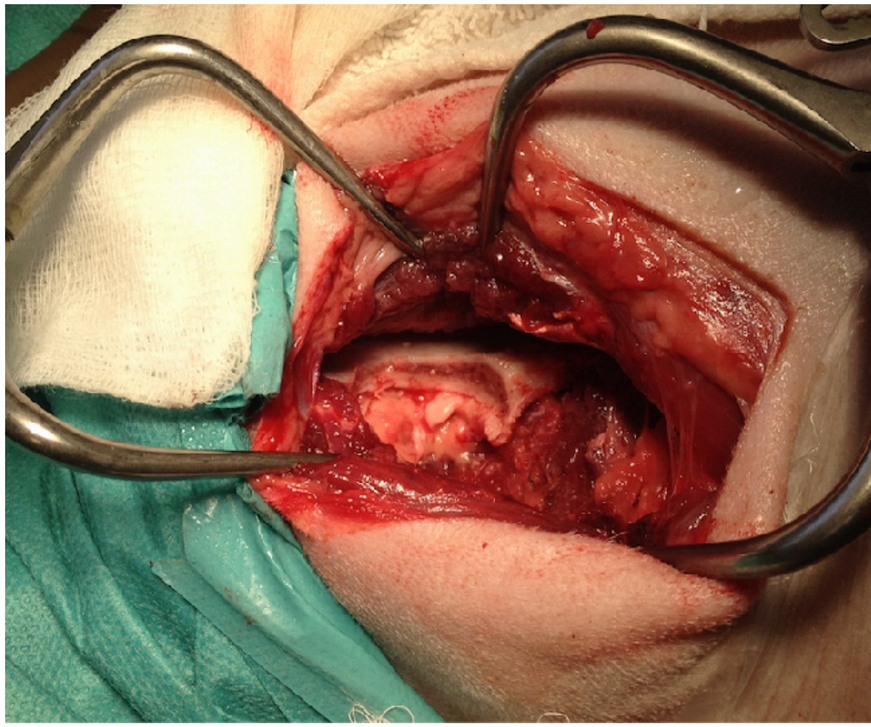
Shearing injury

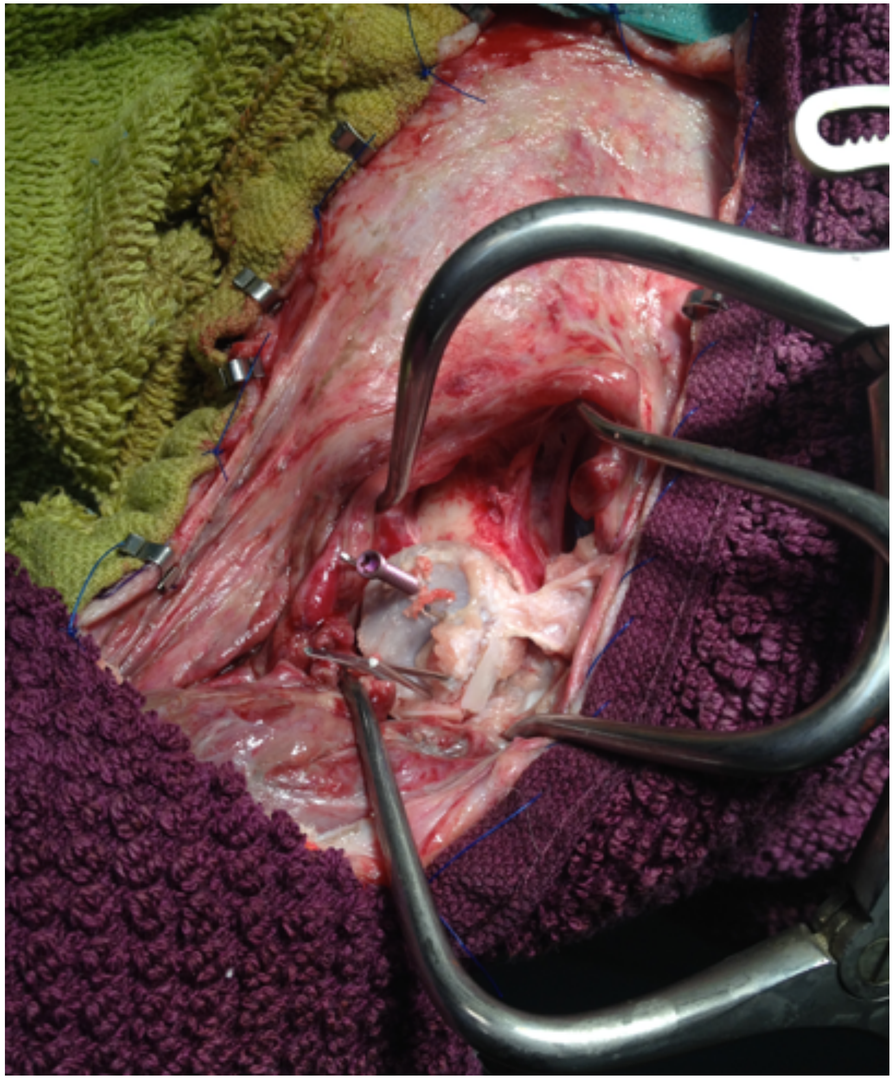


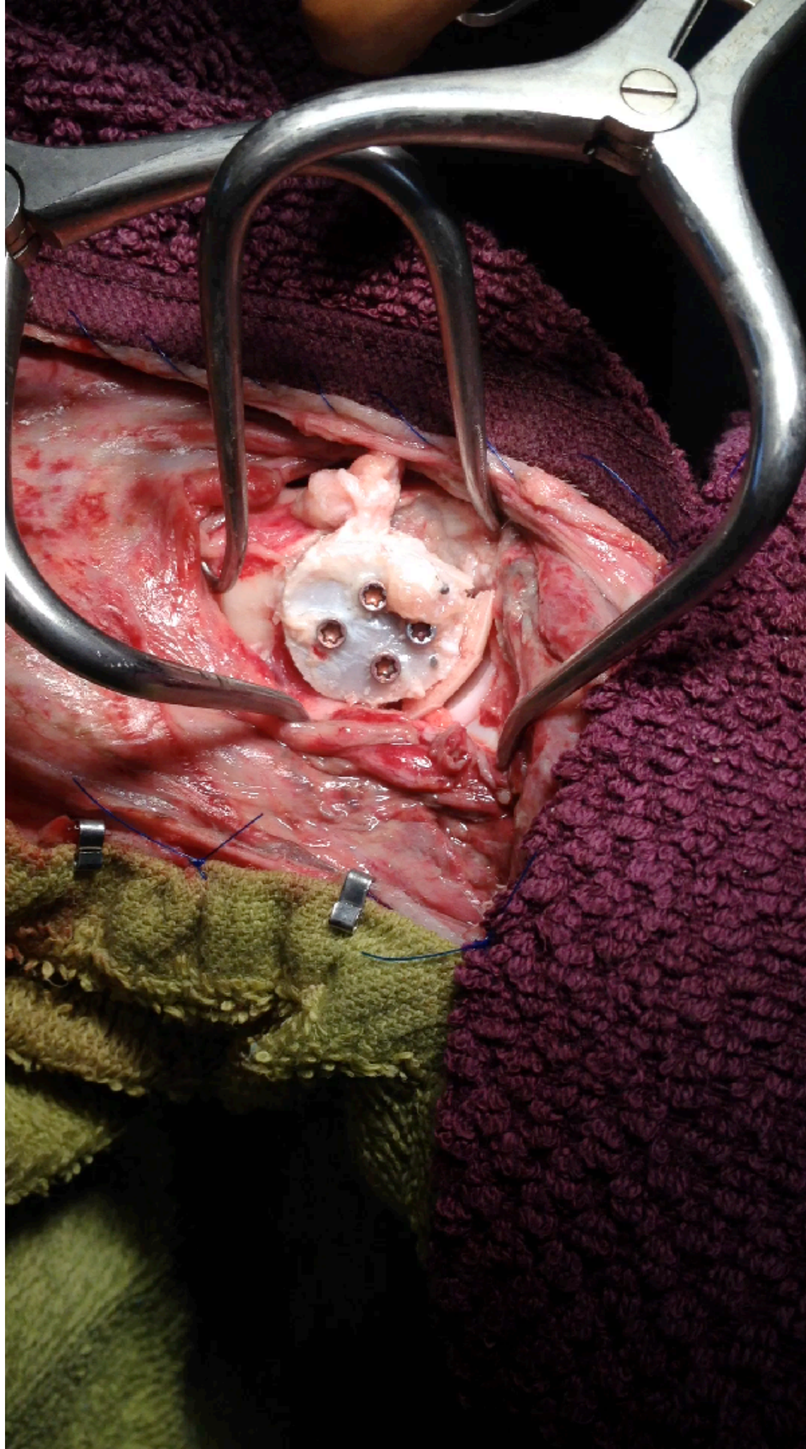

BAVOT

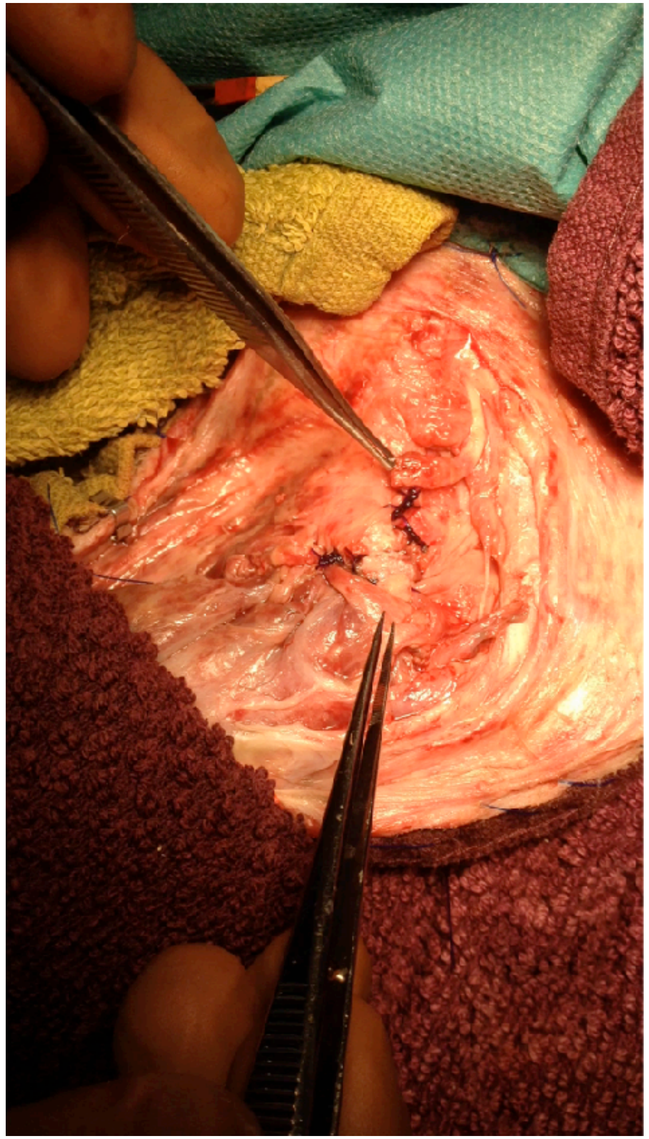


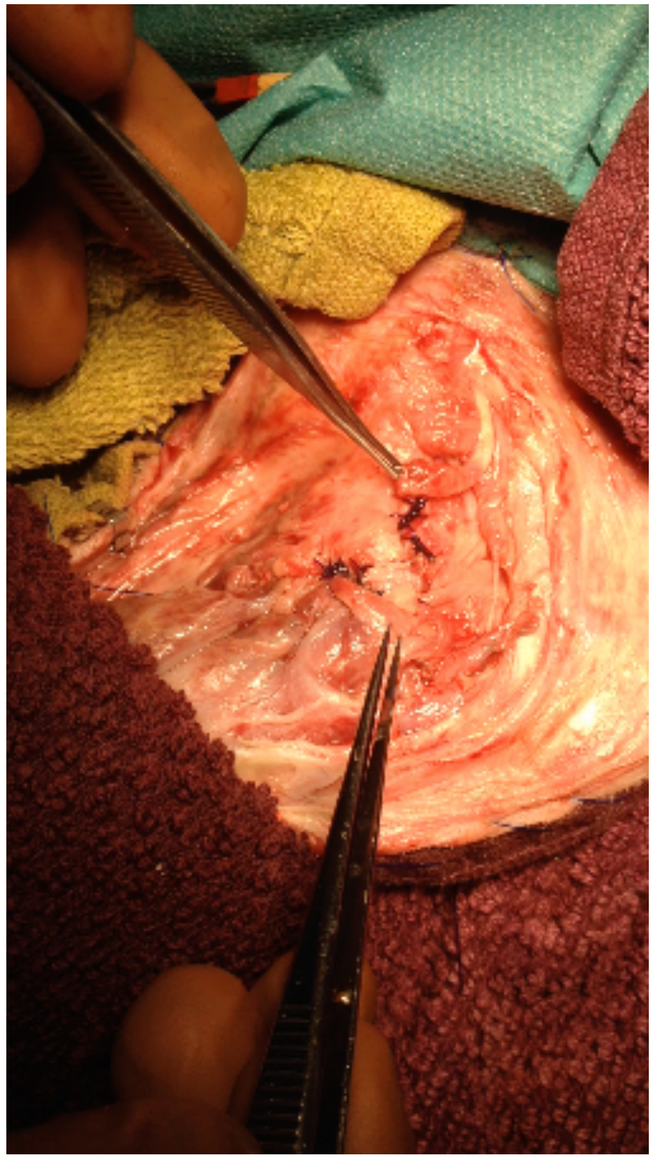


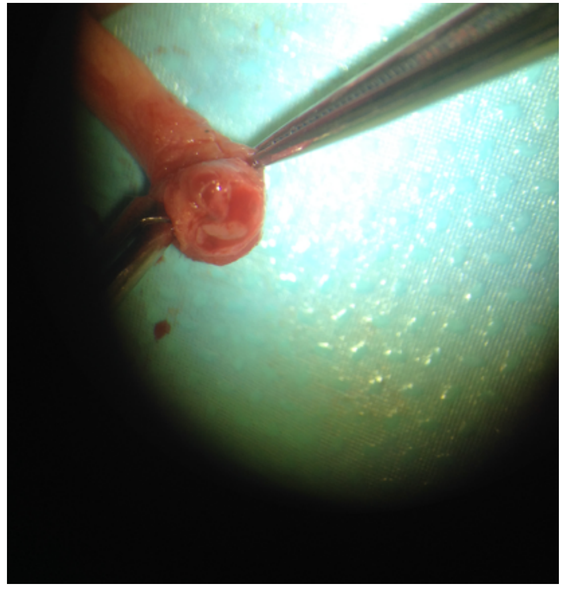


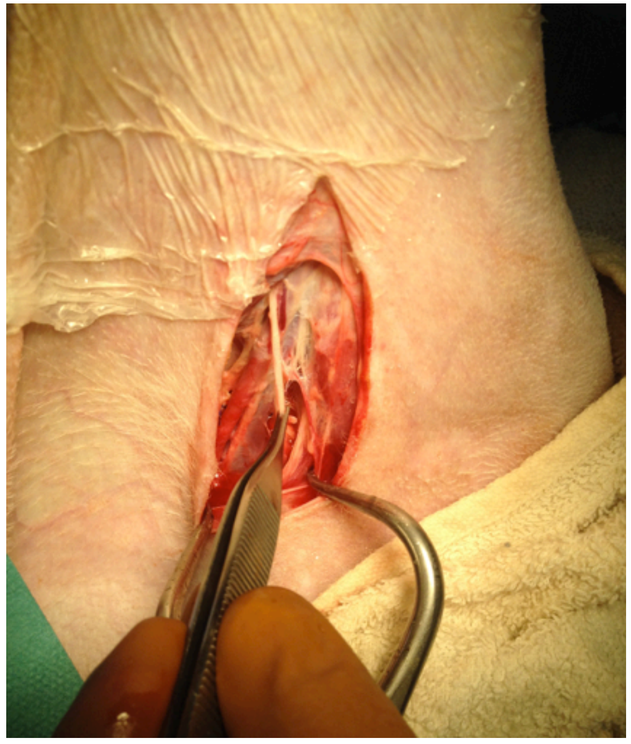


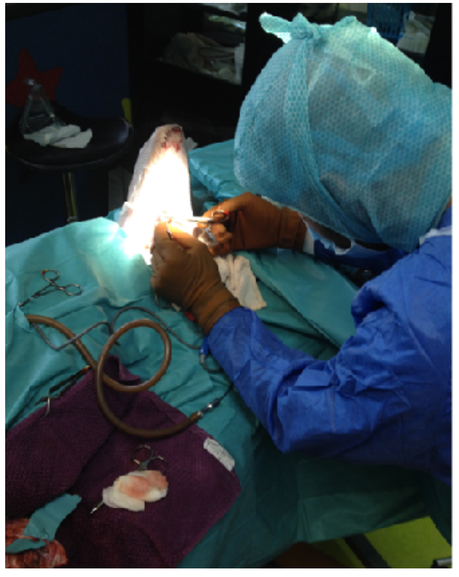


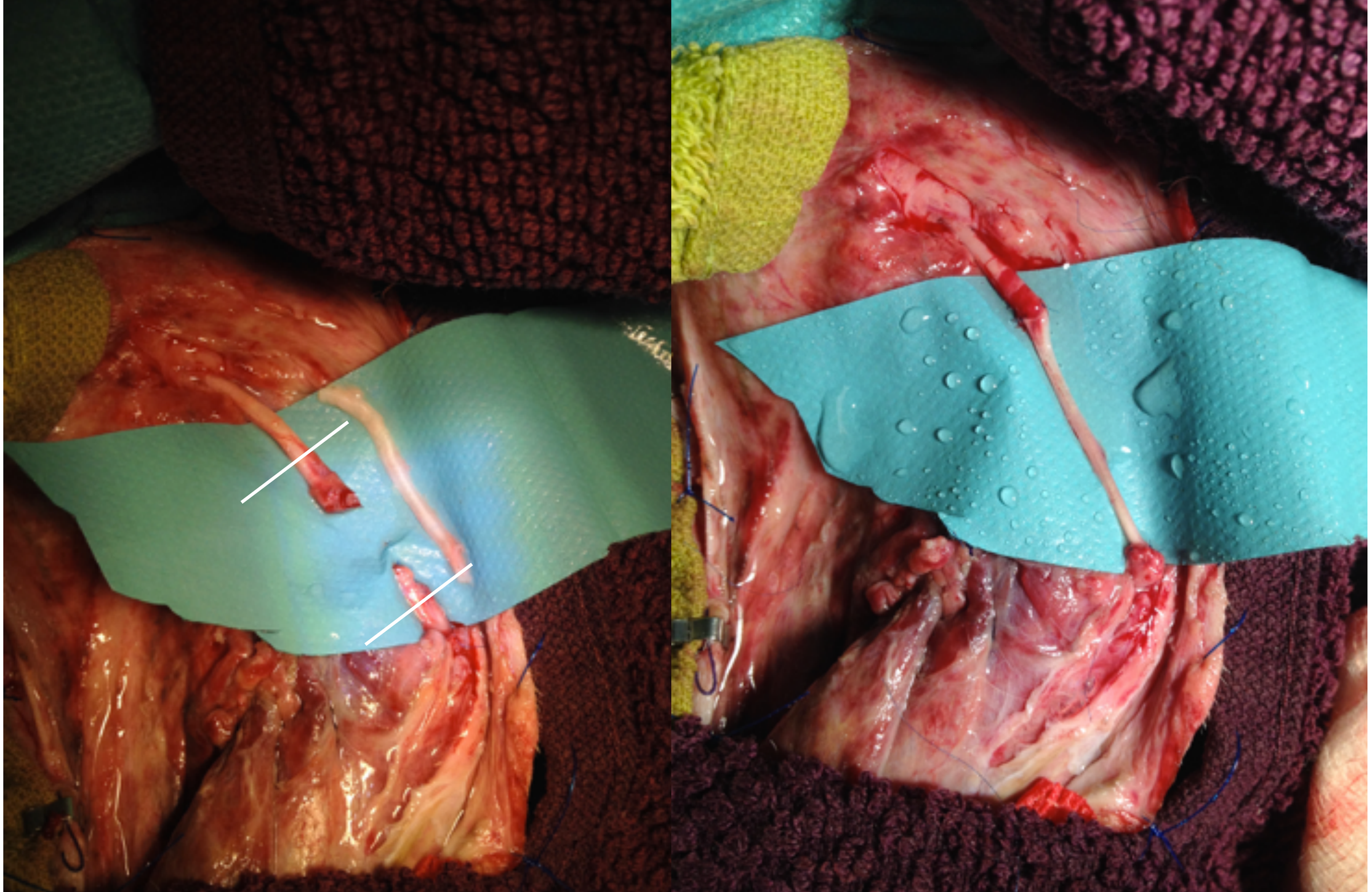


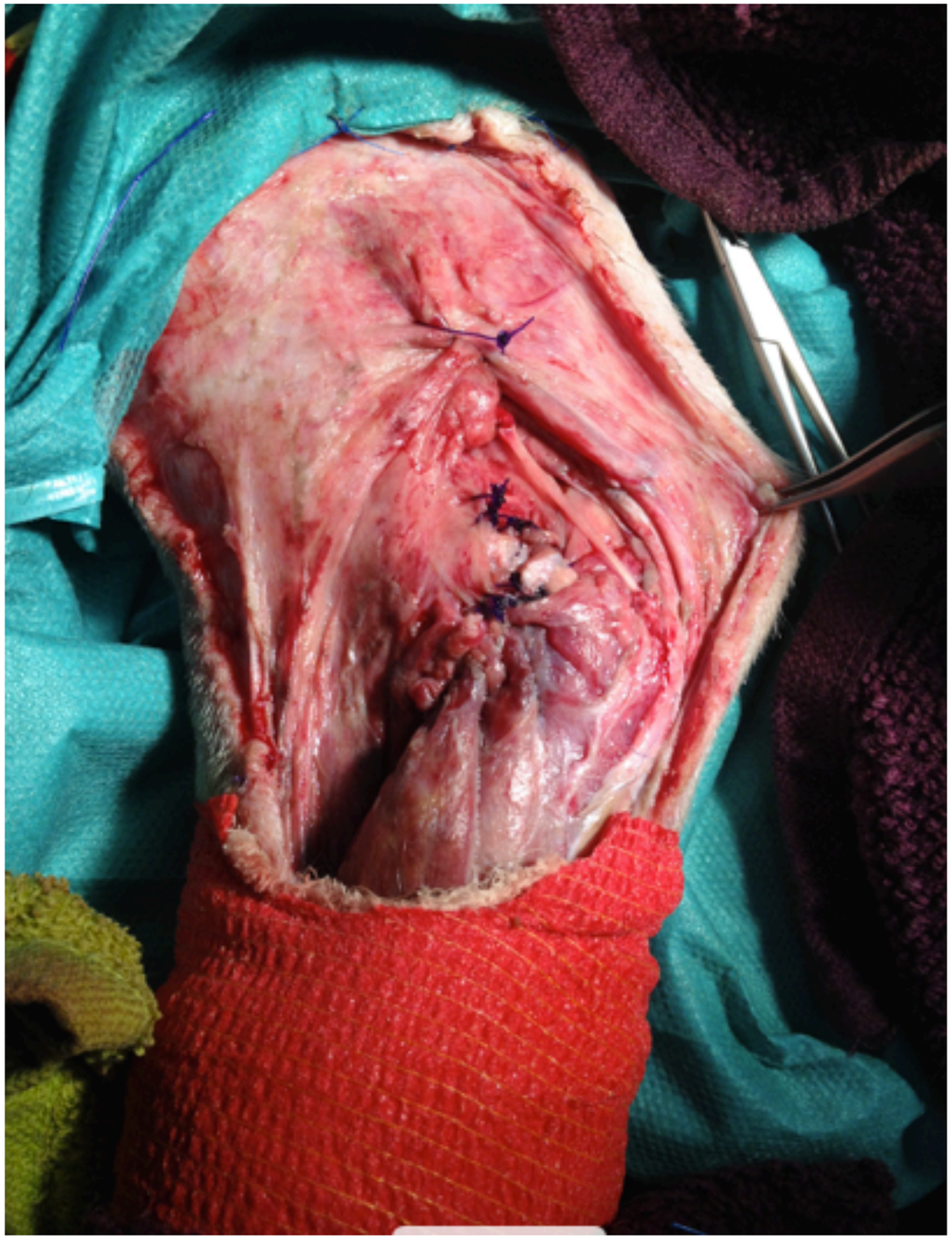


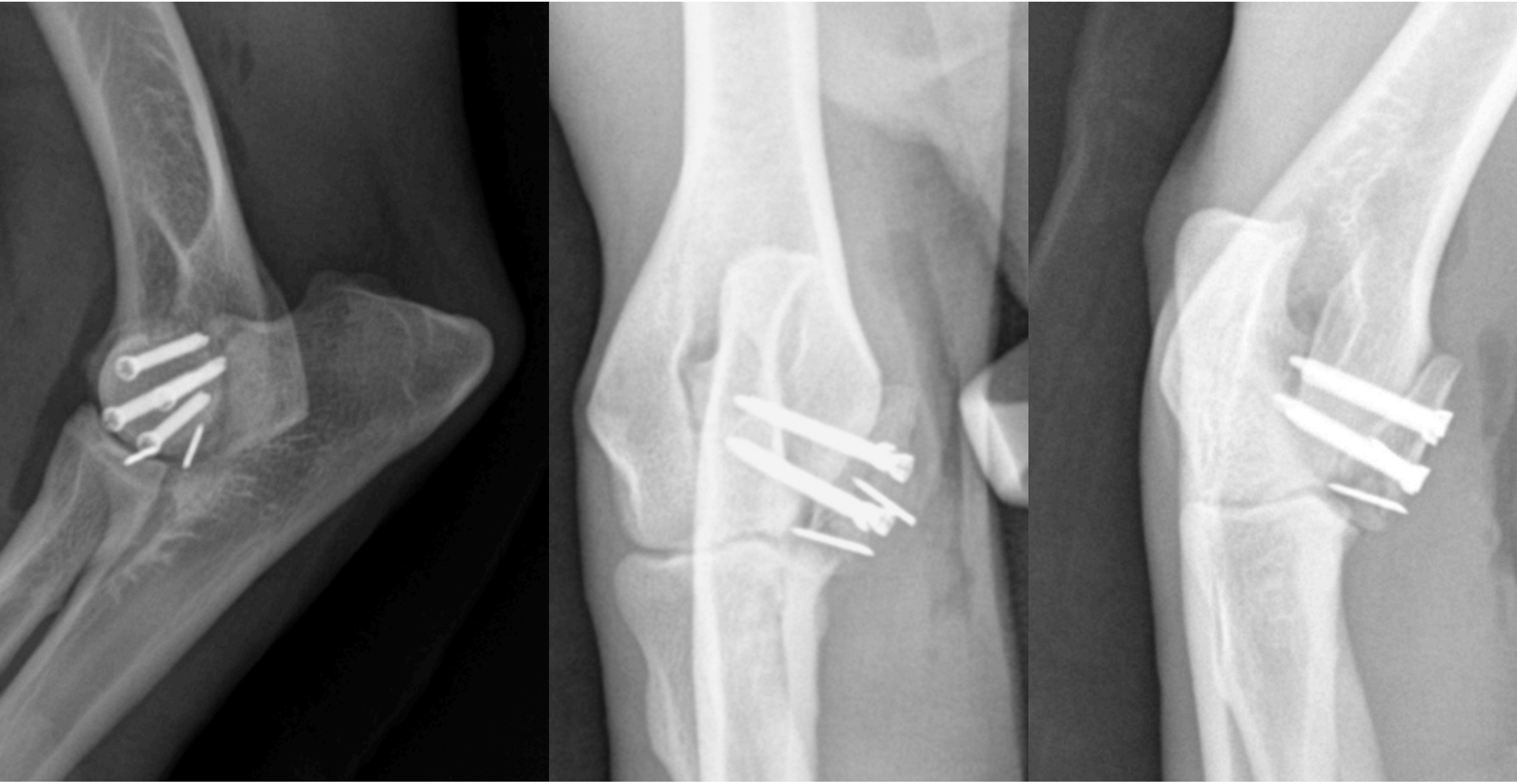




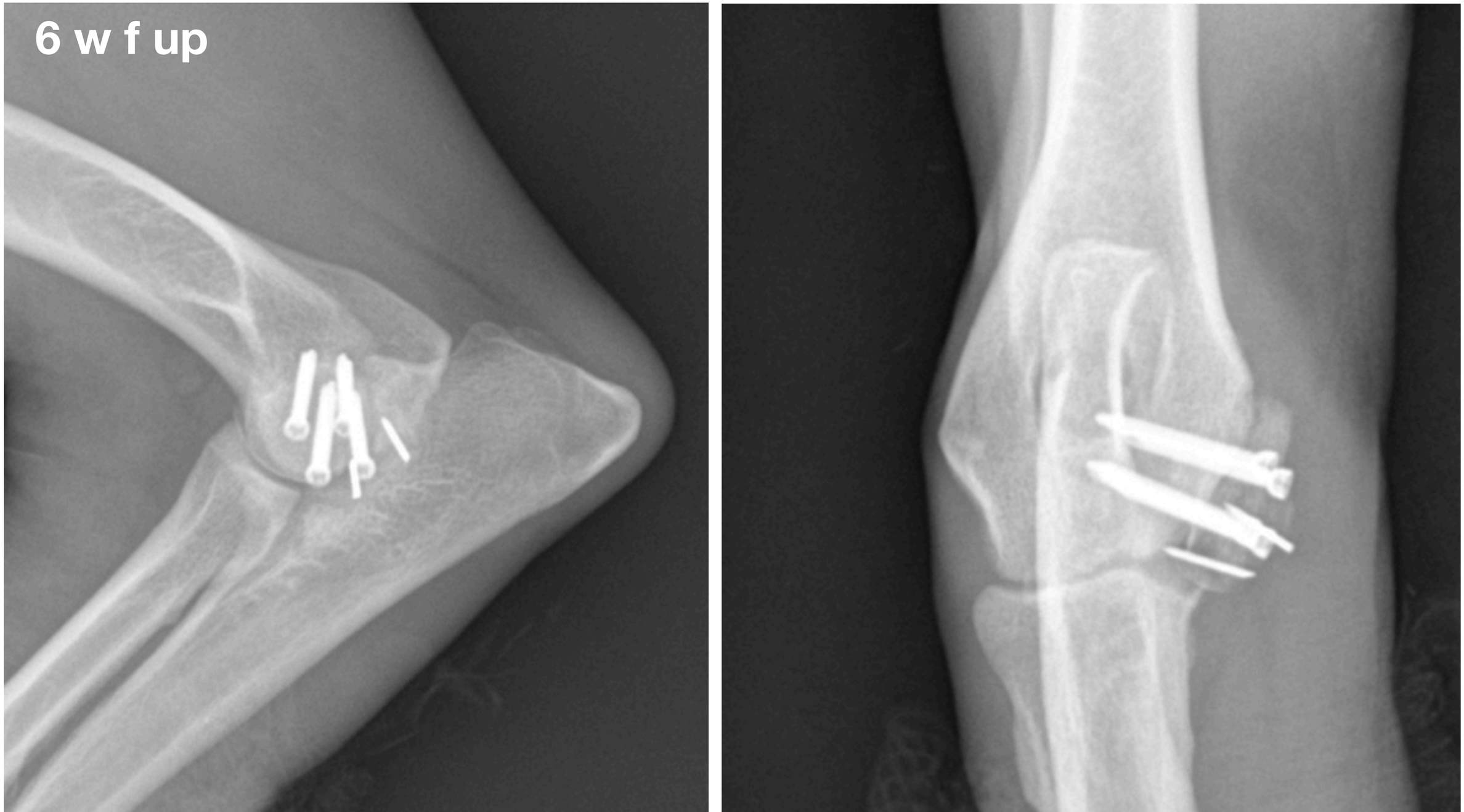






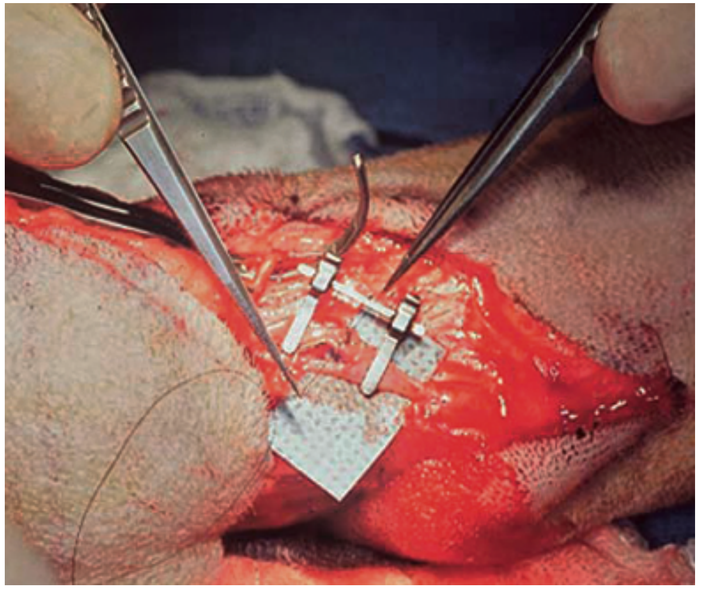


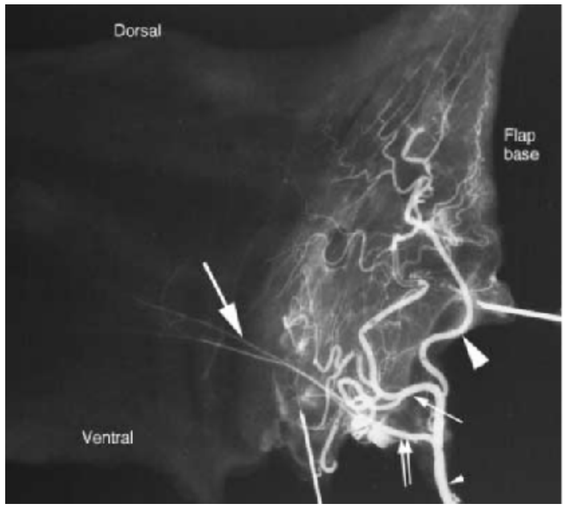
Dishachrage from the clinic, 4 d f up


6 w f up


6 w f up

Microvascular transfers





CASE REPORT

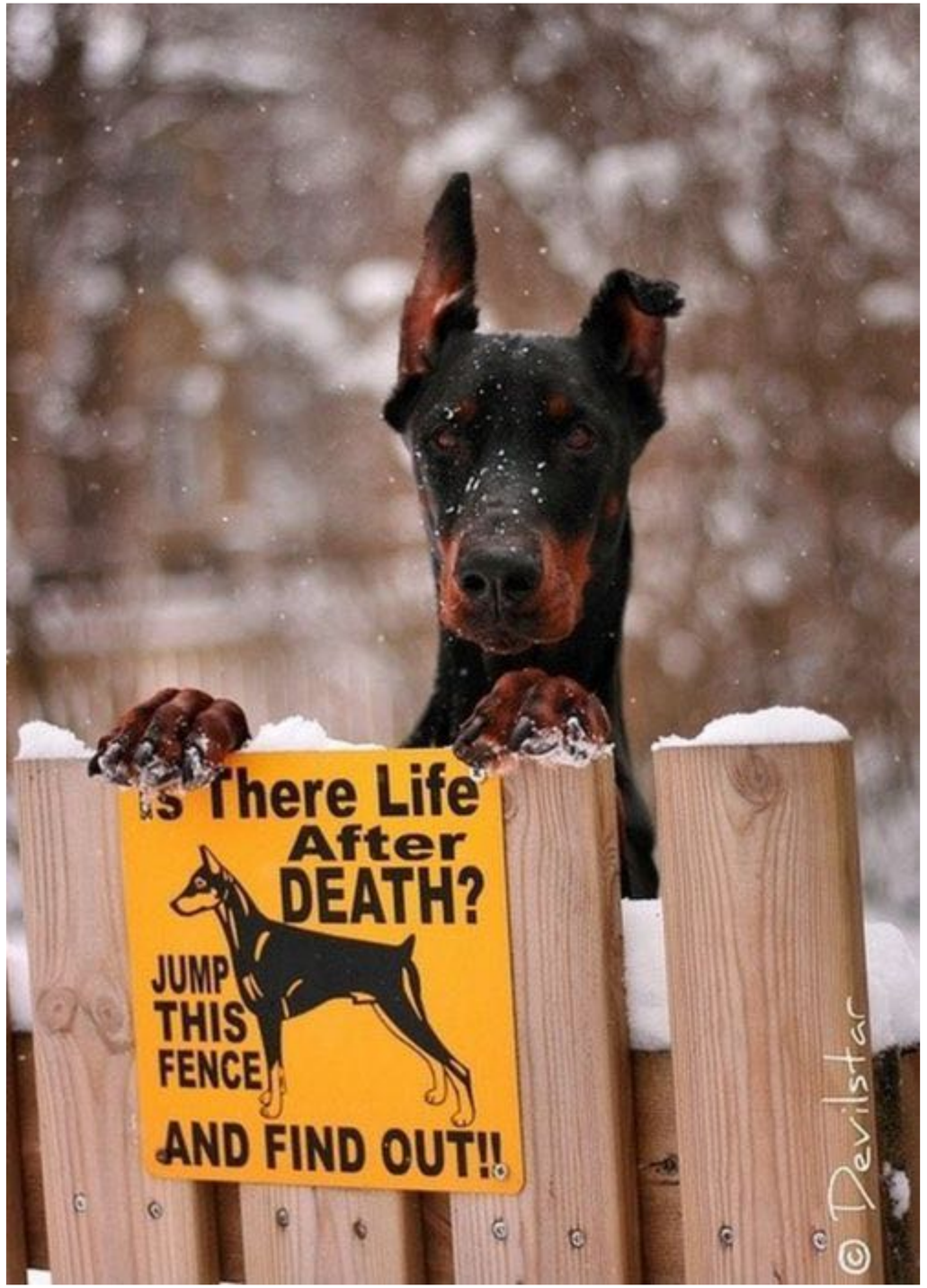
Repair of a canine forelimb skin deficit by microvascular transfer of a caudal superficial epigastric flap

34:297–309,

Surgical Approaches to Recipient Vessels of the Fore- and HindLimbs for Microvascular Free Tissue Transfer in Dogs

DANIEL A. DEGNER, DVM, Diplomate ACVS, RICHARD WALSHAW, BVMS, Diplomate ACVS, J. DAVID FOWLER, DVM, Diplomate ACVS, OTTO I. LANZ, DVM, Diplomate ACVS, PETER OCELLO, MSc, JACKIE MAIER, DVM, LOREN BLAEZER, DVM, Diplomate ACVS, and RICK J. SMITH, MD

Thank you :)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AND FIND OUT!!
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