

Soft Tissue Surgeries in the Field

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Considerations

- Safety – client, vet, horse
 - Patient behavior
 - Patient handling
 - Facilities



Considerations

- Safety – client, vet, horse
- The mass itself
 - Type
 - Location
 - Accessibility
 - Visibility
 - Anatomical structures involved
 - Blood supply



Considerations

- Safety – client, vet, horse
- The mass itself
- Possible complications
 - Involvement of deeper structures
 - Trauma to surrounding structures
 - Excessive hemorrhage
 - Incomplete removal



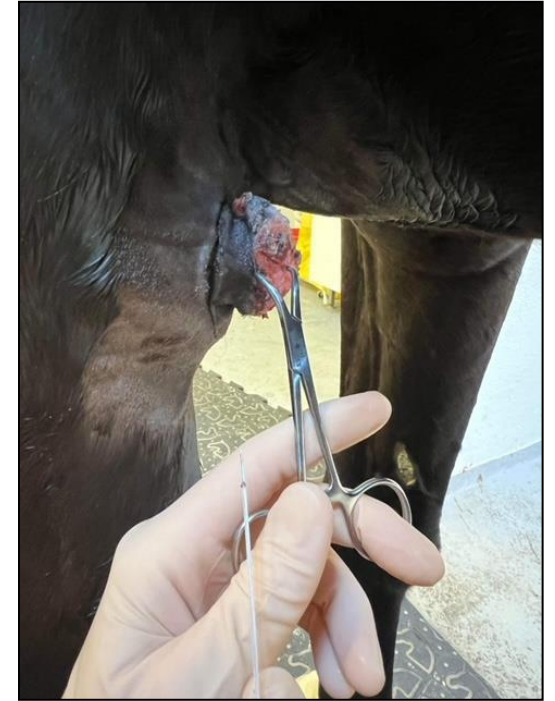
Considerations

- Safety – client, vet, horse
- The mass itself
- Possible complications
- Aftercare
 - Bandaging
 - Wound care
 - Immobilization
 - Box rest



Considerations

- Safety – client, vet, horse
- The mass itself
- Possible complications
- Aftercare
- Owner expectations
 - Costs
 - Recurrence
 - Aftercare



Skin tumors

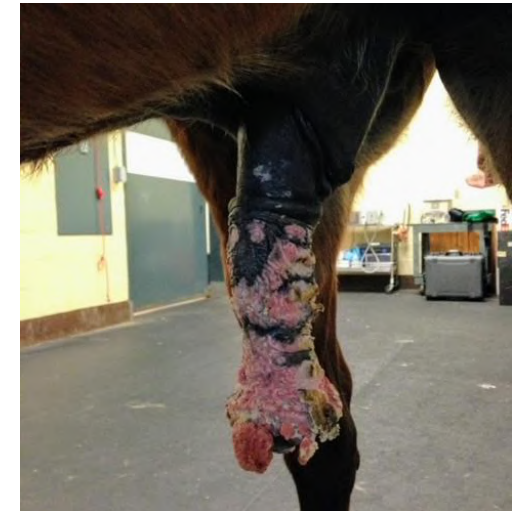
Sarcoid

- Most common cutaneous neoplasm
- Locally invasive, non-malignant*
- Head, neck, legs, ventral body
- May develop in areas with trauma or long standing open wounds



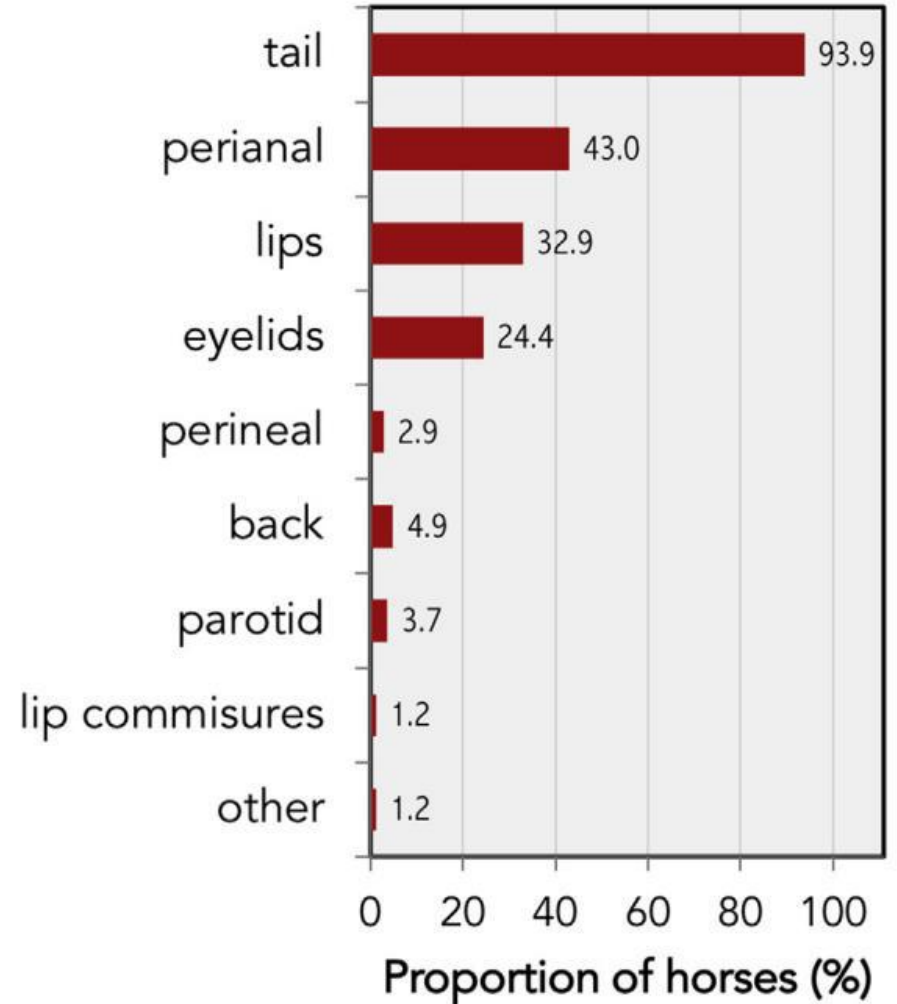
Squamous cell carcinoma

- Second most common
- Malignant, locally invasive
- Non-pigmented areas, mucocutaneous junctions, genitalia, ocular/periorcular
- ca. 19% will metastasize



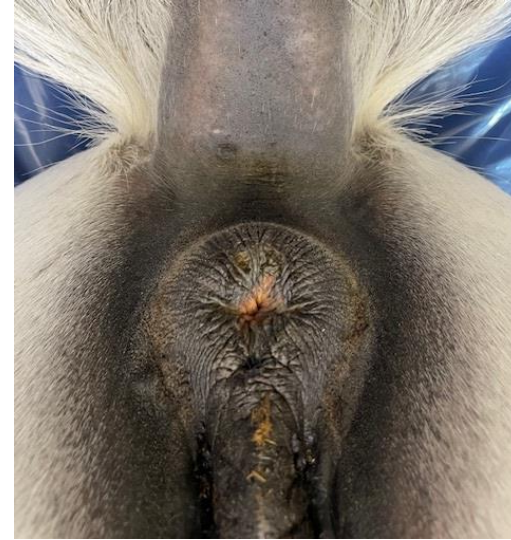
Melanoma

- Third most common
- Aging grey horses
- Firm subcutaneous masses
 - Single to multiple, can coalesce
 - Locally expansive
- Formerly considered benign
 - Now considered ‘potentially malignant’



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Surgical excision

- All masses:
 - Minimum 5mm margins
 - Ideally ≥ 1 cm margins

Surgical excision

- Tumor specific recommendations:
 - Melanomas
 - Remove early while still small
 - Avoid progression into coalescing masses



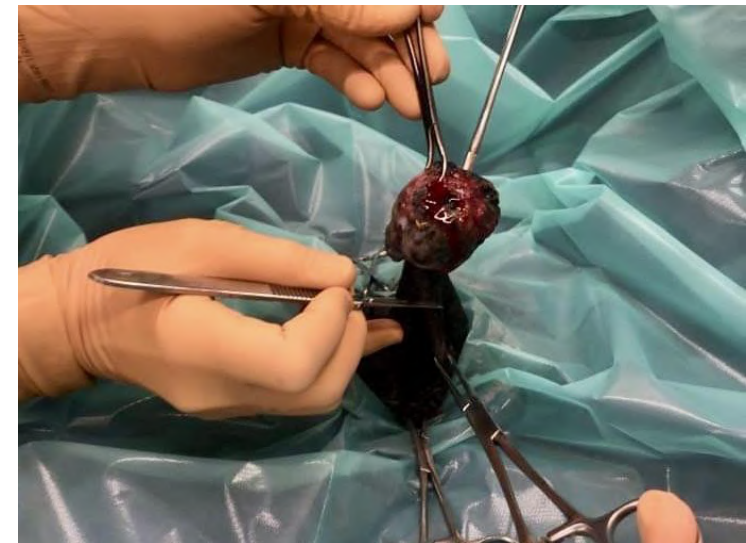
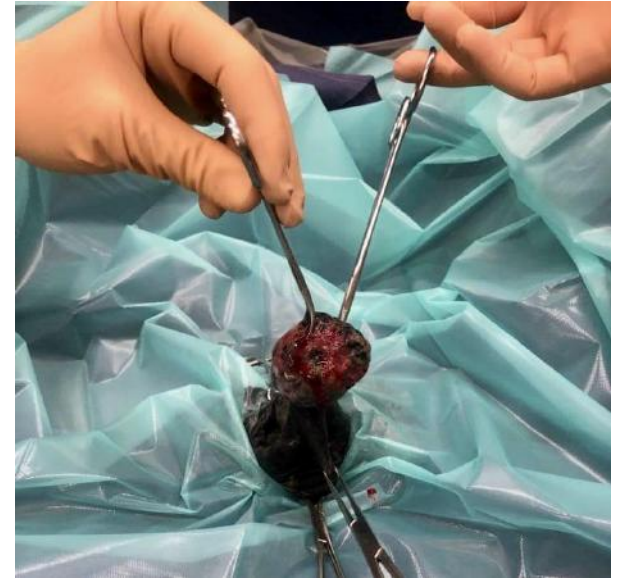
Surgical excision

- Tumor specific recommendations:
 - Melanomas
 - Sarcoids
 - Non-touch technique
 - Margins as wide as possible
 - Minimum 16mm
 - (Laser or electrosurgery if possible)



Surgical excision: non-touch technique

- Minimizes contact with tumor
 - Prevent seeding of tumor cells to wound margins
- Tumor grasped with towel clamp for manipulation
- Incision created without touching tumor
- All instruments set aside after tumor removed
- New gloves, new instruments for closure



Surgical excision

- Recurrence rates
 - Sarcoids: common
 - 15-82% following sharp excision
 - Melanomas: uncommon
 - SCC: relatively common
 - 11-30% for penile tumors
 - Up to 60% for eyelids



Ophthalmic procedures

Eyelid lacerations

- Primary goal: Preservation of eyelid function
 - Normal margin crucial!
- Many can be repaired in field
- Medial canthus involvement
 - Refer if possible
 - May require repair or stenting of nasolacrimal duct



Eyelid lacerations

- Primary goal: Preservation of eyelid function
 - Normal margin crucial
- **Technique:**
 - Prep with dilute betadine and saline
 - Avoid chlorhexidine and spirit
 - Local anesthesia
 - Auriculopalpebral nerve block
 - Line block peripheral to laceration
 - Oxybuprocaine



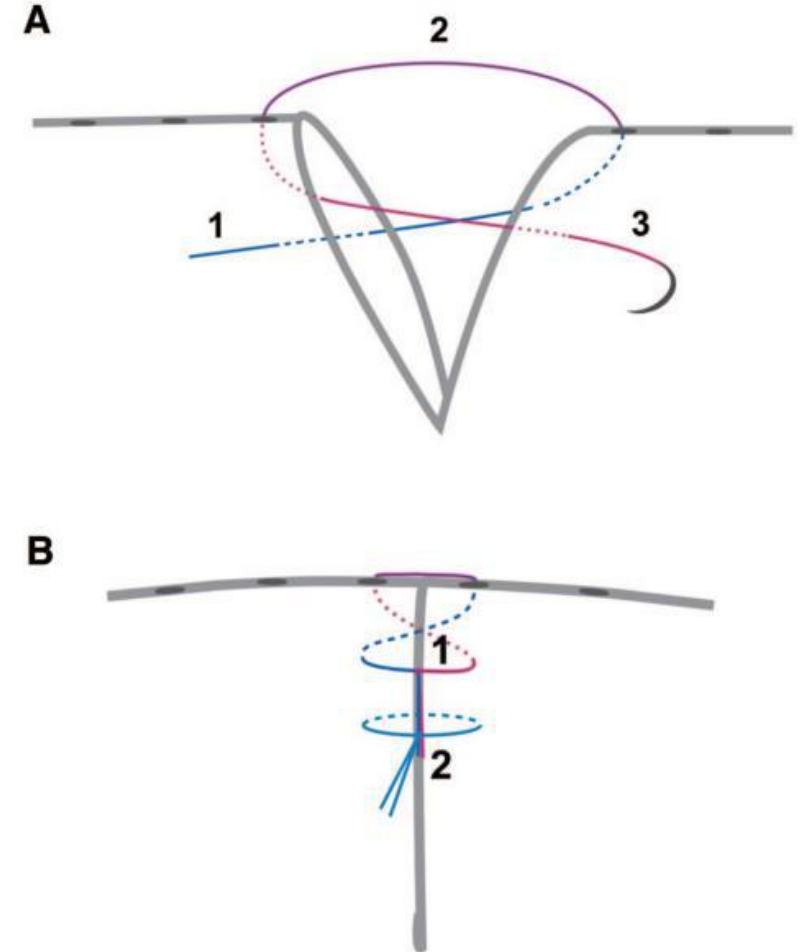
Eyelid lacerations

- Primary goal: Preservation of eyelid function
 - Normal margin crucial
- **Technique:**
 - Minimal excess tissue
 - Avoid removing tissue when possible



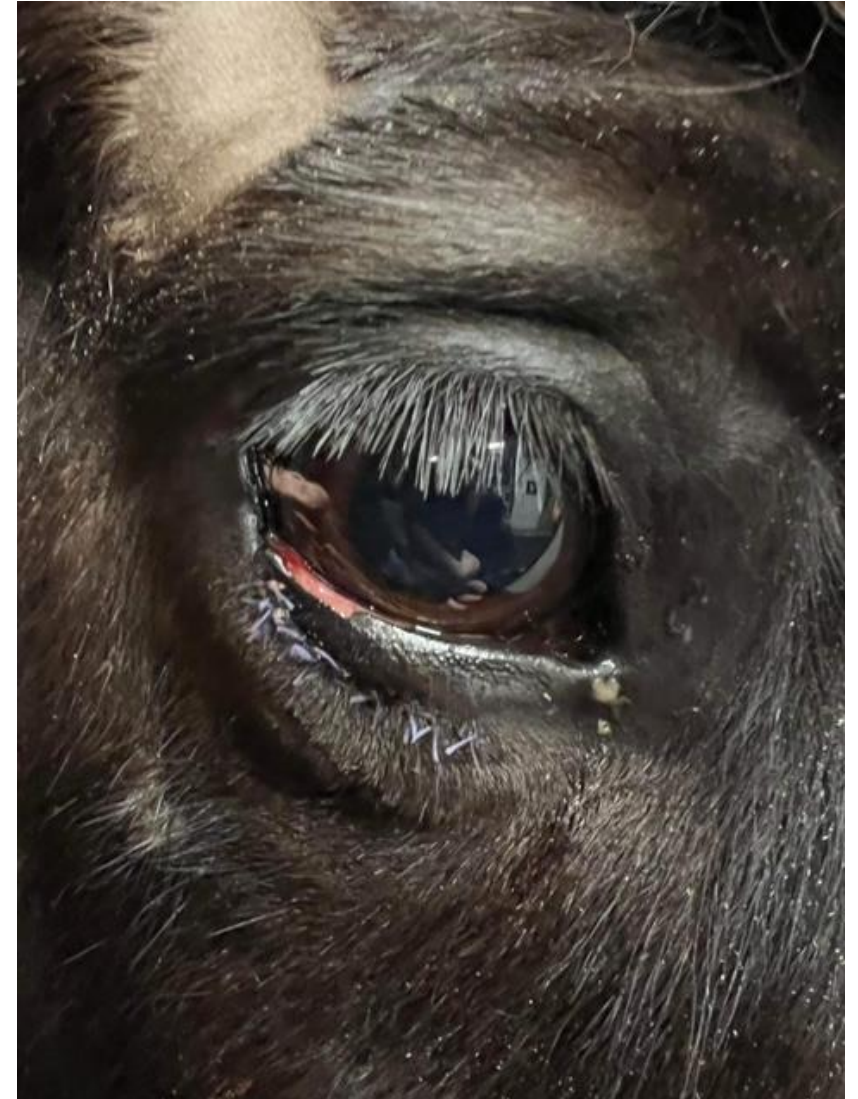
Eyelid lacerations

- Primary goal: Preservation of eyelid function
 - Normal margin crucial
- **Technique:**
 - Vicryl is preferred suture: 4-0
 - Two layer closure when possible
 - Stroma – orient knots away from conjunctiva
 - Skin
 - Figure of 8 suture to appose eyelid margin
 - Most important suture!
 - Ensure good alignment



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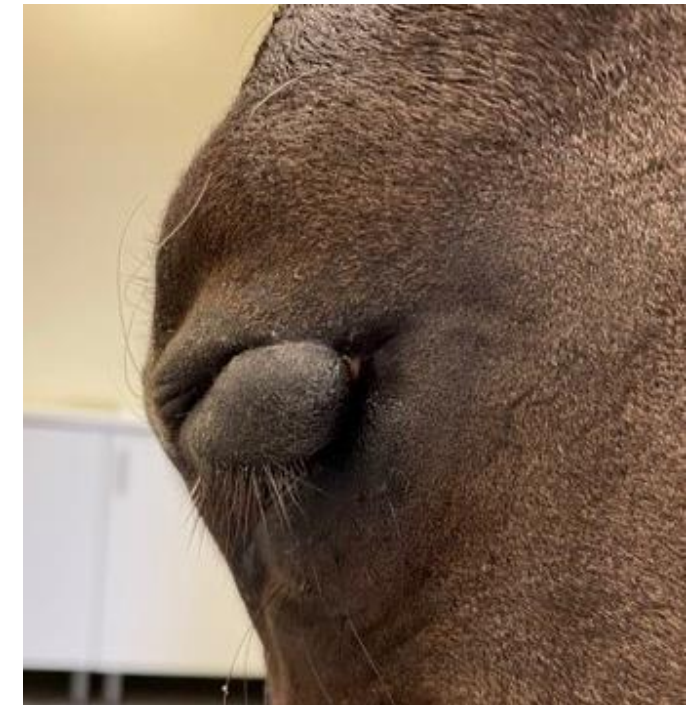
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Third eyelid masses

- Surgical removal possible in the field
- Good sedation
 - Detomidine or romifidine
 - Avoid butorphanol?



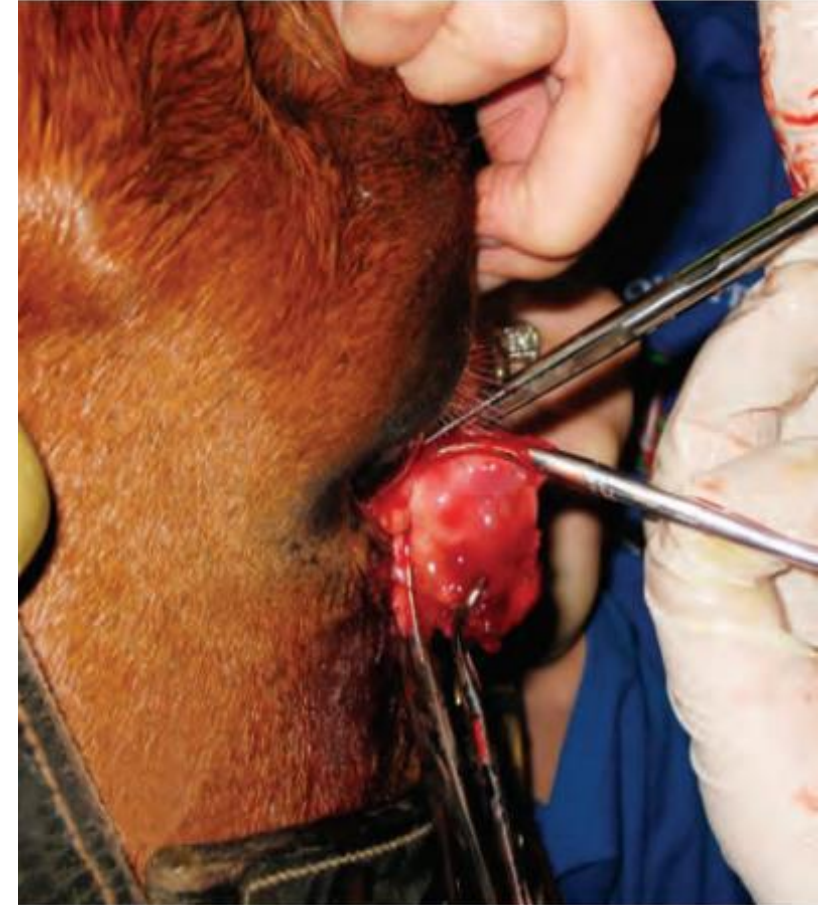
Third eyelid masses

- Surgical removal possible in the field
- Good sedation
- Local anesthesia
 - Auriculopalpebral, frontal, infratrochlear nerves
 - Topical anesthetic – oxybuprocaine
 - Mepivacaine at base of third eyelid – 25g needle



Third eyelid masses

- Surgical removal possible in the field
- Good sedation
- Local anesthesia
- Technique
 - Grasp 3rd eyelid with towel clamp/forcep
 - Hemostatic clamps across base
 - Use scissors to cut along hemostats



Third eyelid masses

- Aftercare:
 - Topical abx for 3-5 days
 - NSAIDs
- Minimal complications
 - Prolapse of retrobulbar fat
 - Mild ocular discharge
- Recurrence
 - 0-19%
 - Payne, Vet Rec 2009; Labelle, EVJ 2011; Scherrer, JAVMA 2014
 - No difference if done standing or under GA
 - Labelle, EVJ 2011



Enucleation

- Feasible in the field with the right patient
- Safety
 - Patient tolerance of sedation
 - Patient tolerance of blocks
 - Facilities
 - Stocks – ideal
 - Headrest
 - Clean area
 - Good lighting



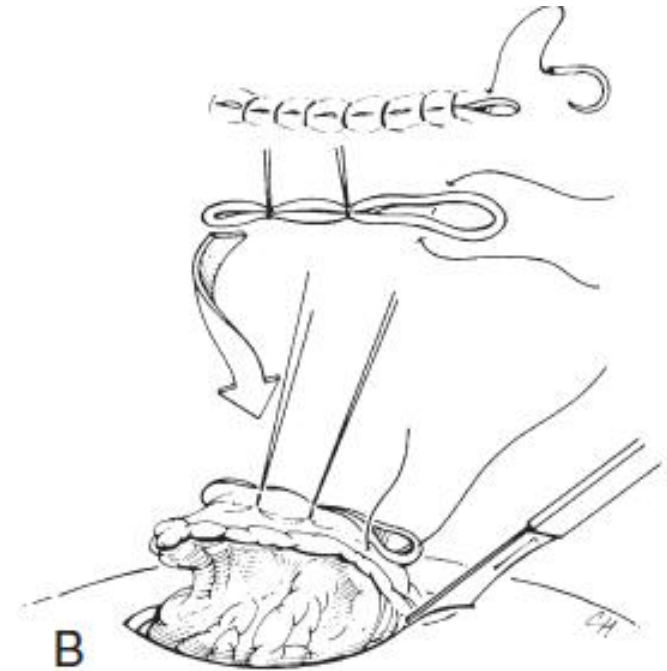
Enucleation

- Sedation
 - Detomidine CRI
- Local anesthesia
 - Retrobulbar block
 - Frontal and auriculopalpebral nerves
 - Ring block around orbital margin
 - Topical anesthesia for cornea/conjunctiva



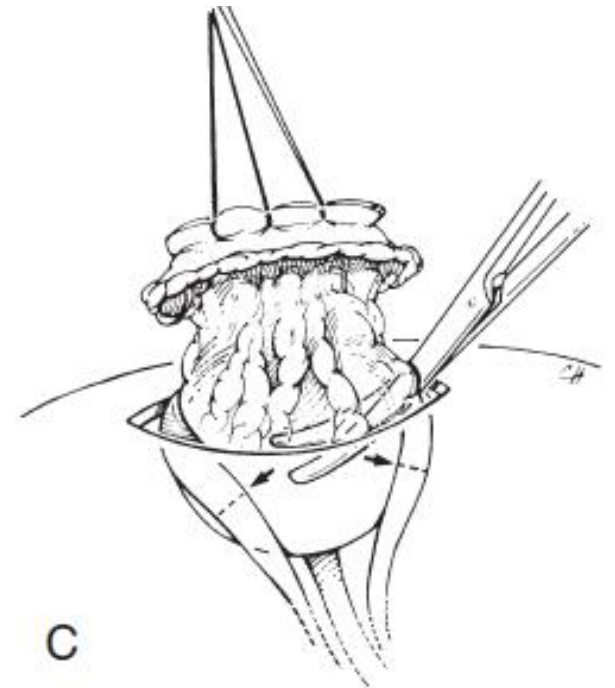
Enucleation

- Transpalpebral technique:
 - Eyelids closed with whip stitch
 - Incision 5-10mm from eyelid margins



Enucleation

- Transpalpebral technique:
 - Dissect caudally – close to conjunctiva without penetrating
 - Transect medial and lateral canthal ligaments
 - Dissect along sclera
 - Identify tendons of extraocular muscles and transect
 - Transect optic cone



Enucleation

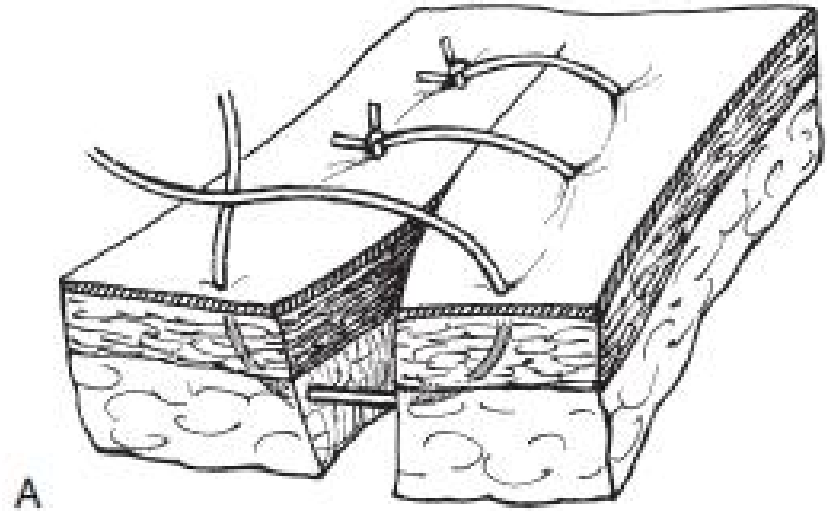
- Transpalpebral technique:
 - Suture meshwork?
 - Close subcutaneous tissues and skin
- Aftercare:
 - NSAIDs
 - Antibiotics
 - Bandage 24-48 hours



Wound closure techniques

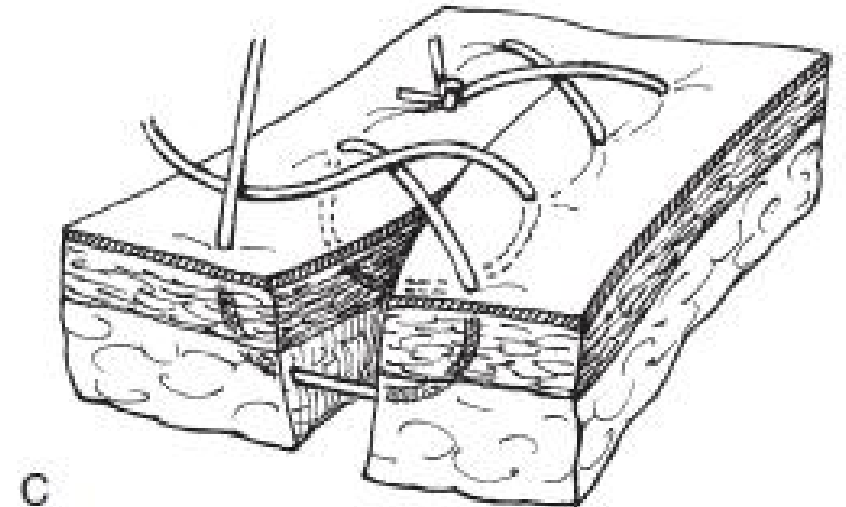
Suture patterns

- **Appositional**
 - **Simple interrupted**
 - Quick, precise



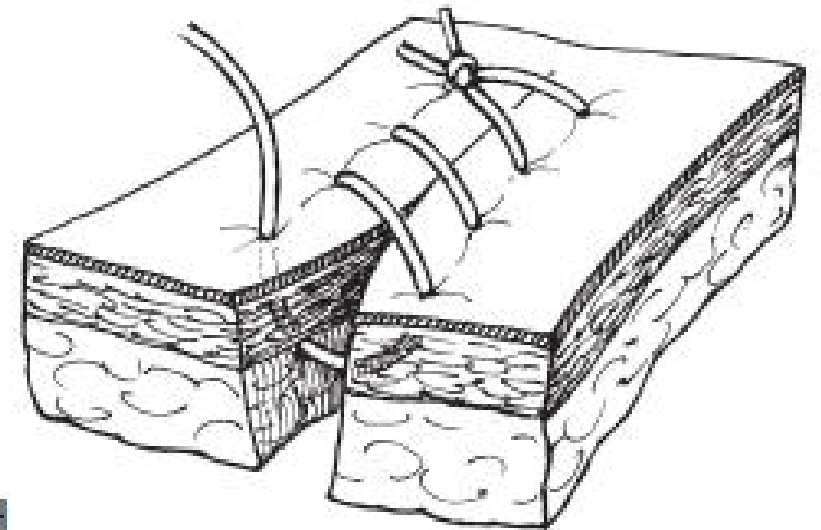
Suture patterns

- **Appositional**
 - Simple interrupted
 - **Cruciate**
 - Stronger than simple interrupted
 - Resists tension
 - Covers more tissue per suture



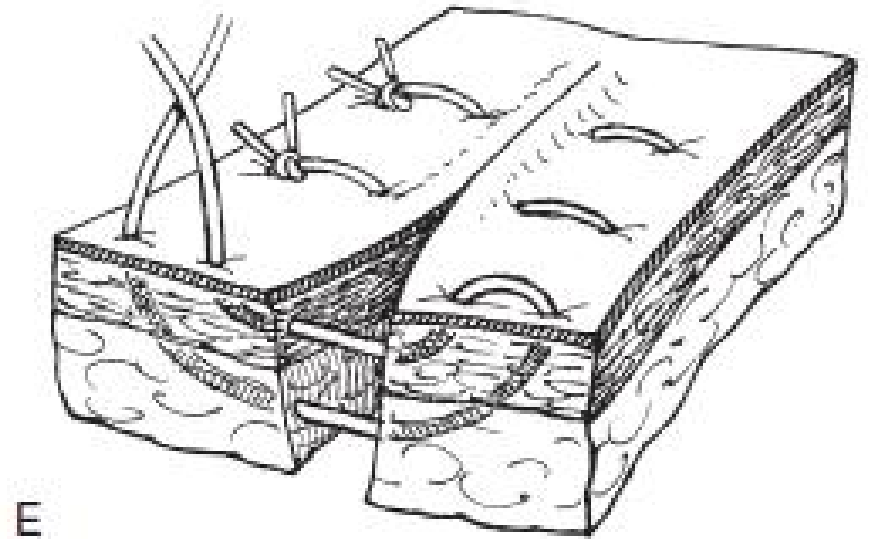
Suture patterns

- **Appositional**
 - Simple interrupted
 - Cruciate
 - **Simple continuous**
 - Saves time and material
 - Breakage can cause whole line failure



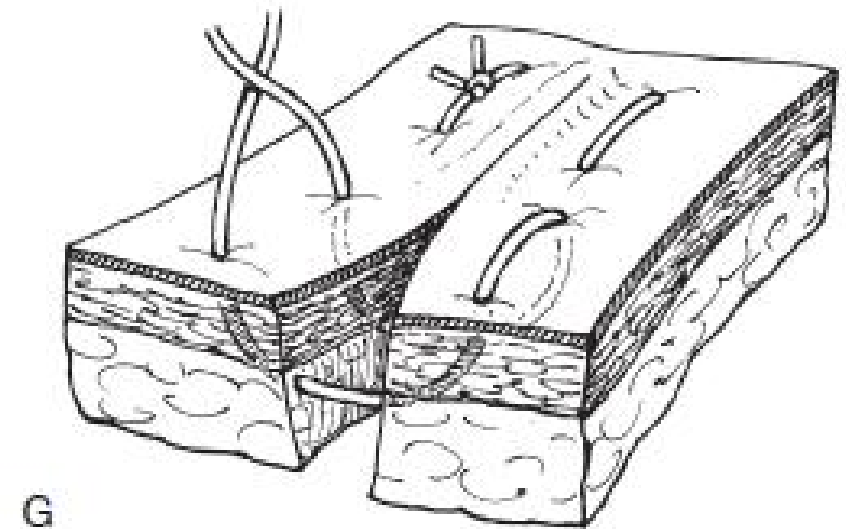
Suture patterns

- **Tension relieving**
 - **Vertical mattress**
 - Appositional to everting
 - Minimal vascular compromise
 - Better under tension than HM



Suture patterns

- **Tension relieving**
 - Vertical mattress
 - **Horizontal mattress**
 - More everting than VM
 - Potential vascular compromise



Suture patterns

- **Tension relieving**

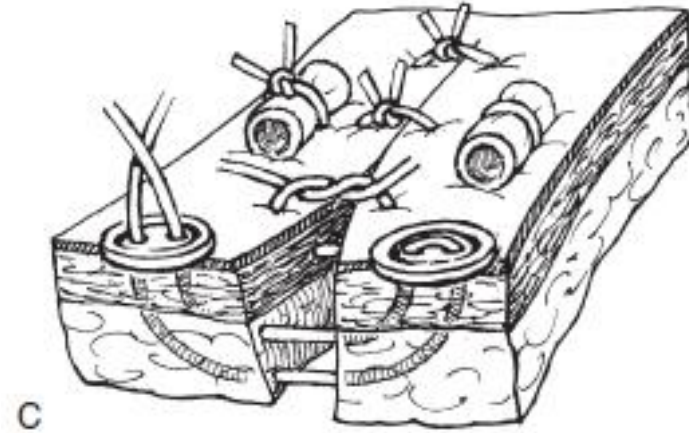
- Vertical mattress

- Appositional to everting
- Minimal vascular compromise
- Better under tension than HM

- Horizontal mattress

- **Stented/quilled**

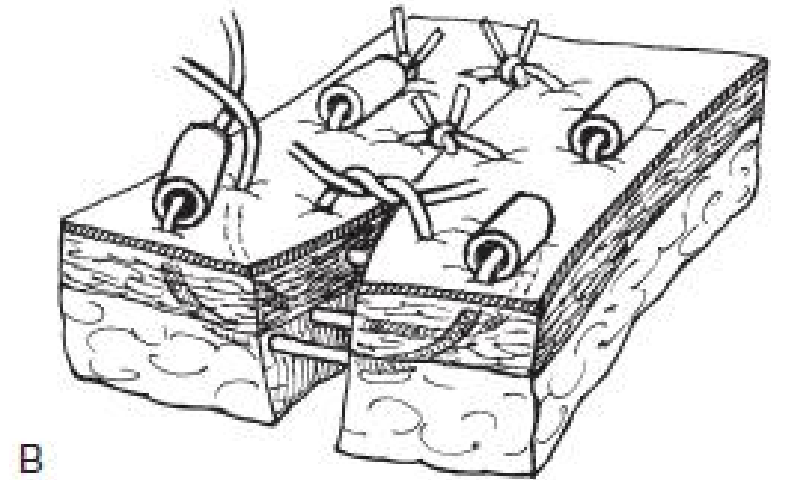
- Suture incorporates plastic/button
 - Distributes force on skin
- Reduces suture cut-through



Suture patterns

- **Tension relieving**

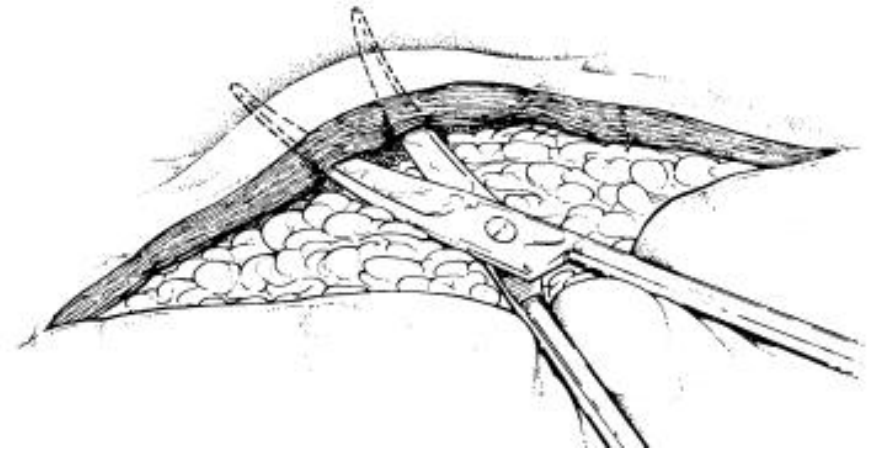
- Vertical mattress
- Horizontal mattress
- Stented/quilled



- Place as needed to approximate wound margins
- Appose skin edges with simple interrupted or cruciate

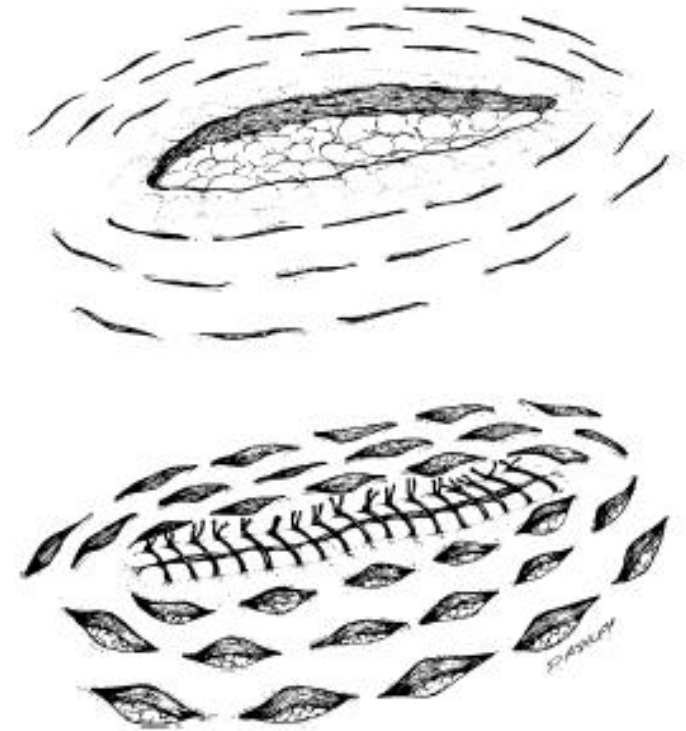
Coping with tension

- **Undermining skin**
 - Simple, safe
 - Blunt or sharp dissection
 - Elevate distance equal to width of defect



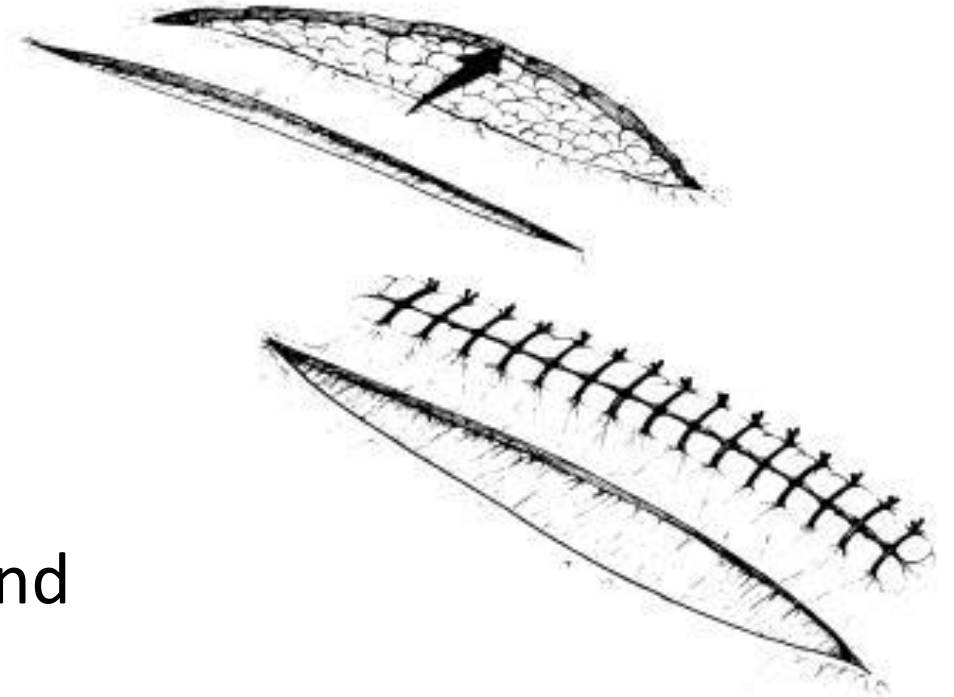
Coping with tension

- **Undermining skin**
- **Mesh expansion**
 - Multiple small incisions
 - Staggered rows, parallel to wound





Coping with tension

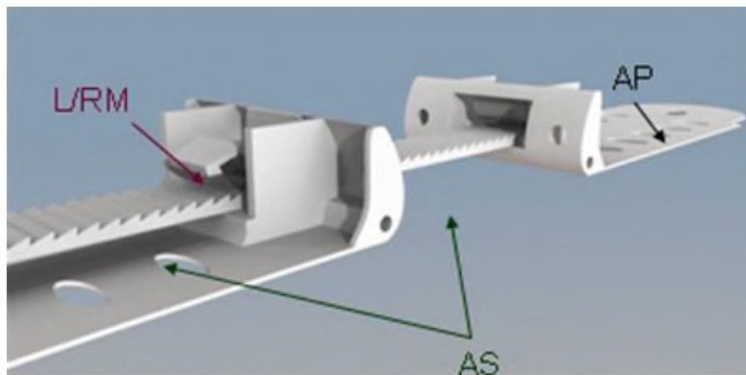
- **Undermining skin**
- **Mesh expansion**
- **Tension-release incisions**
 - Longitudinal incision made parallel to wound
 - Can create on one or both sides of wound
 - Justified if needed to cover vital structures



A novel tension relief technique to aid the primary closure of traumatic equine wounds under excessive tension

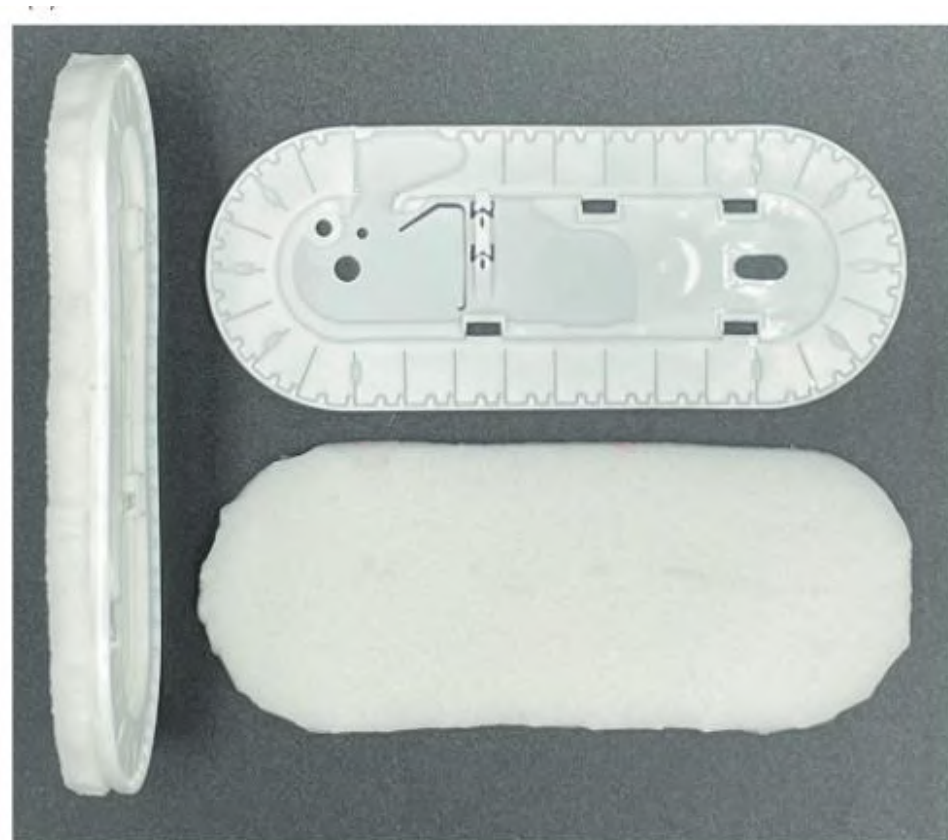
Francesco Comino¹  | Patrick J. Pollock² | Ian Fulton³ |
Charlotte Hewitt-Dedman²  | Ian Handel² | Dylan A. Gorvy^{1,4}

- ‘Tension tile system’ based on devices available in human medicine
 - Wider surface area in contact with skin helps prevent pressure necrosis

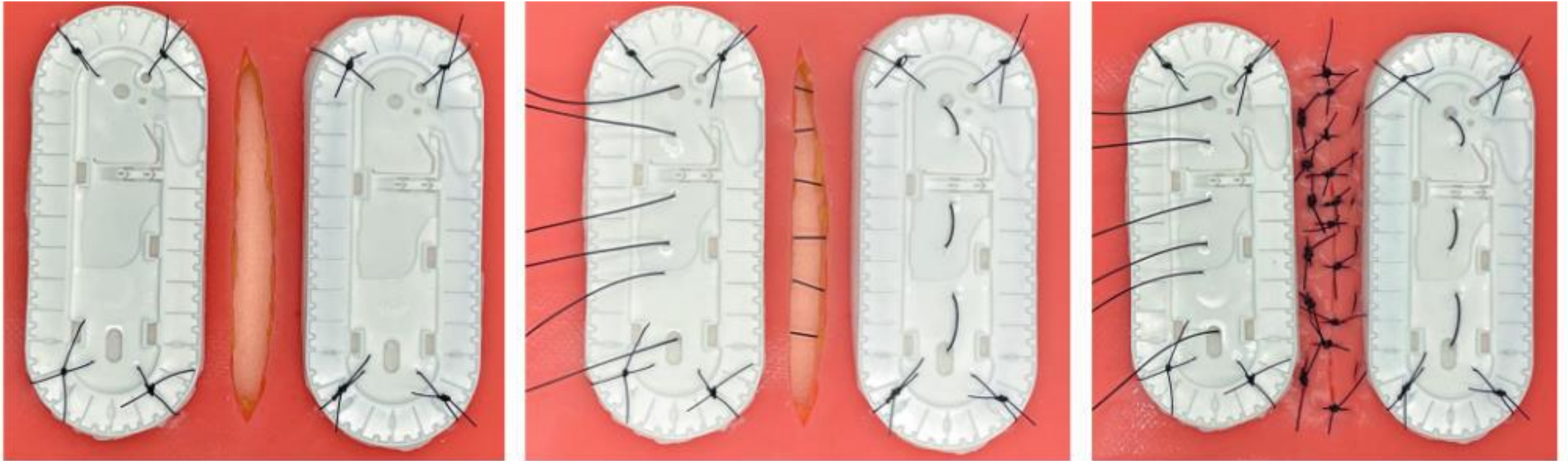


Tension tile system

- Inexpensive
 - Uses readily available materials



Tension tile system



Tension tile system

- 191 wounds
 - All wounds repaired under anesthesia
- 69% primary healing without dehiscence
- 16% partial dehiscence
- 15% complete dehiscence
 - Infection, ongoing necrosis
- Similar success rates for acute, delayed and chronic wounds



Suture material selection

- Suture should be as strong as normal tissue
- Oversized suture can weaken a wound
- With tension, increased number of sutures rather than increased size



Suture material selection

- Skin
 - Monofilament
 - Non-absorbable*
 - Cutting needle



Suture material selection

- Subcutis
 - Monofilament or multifilament
 - Clean vs. dirty wound
 - Absorbable



Suture material selection

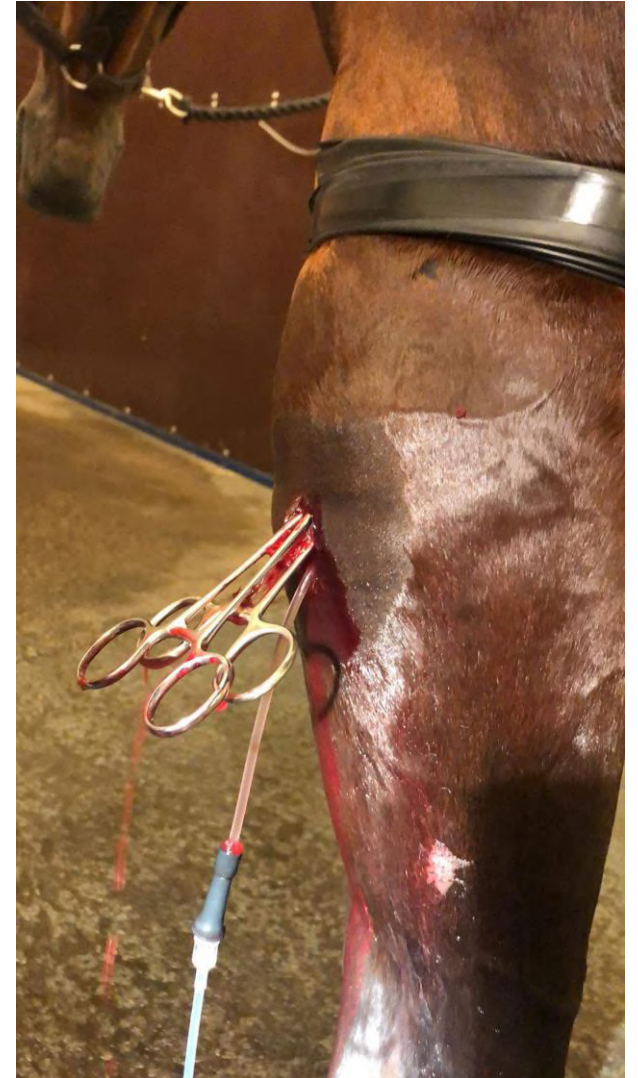
- Fascia
 - Monofilament or multifilament
 - Slow healing tissue – slowly absorbing material



Hemorrhage

Hemorrhage

- Tourniquet
- Ligation
 - Often difficult to identify source
 - If possible, double ligation with absorbable suture
- Pressure bandage – leave in place 48 hours



Hemorrhage

- Hemosilate (ethamsylate)
 - Improves platelet adhesion
 - Reduces bleeding time and blood loss
- Cyklokapron (tranexamic acid)
 - Inhibits activation of plasminogen to plasmin
 - Anti-fibrinolytic
- Can use both medications together





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