


# Swine Surgery Tips and Tricks


2024 MVMA Winter Meeting  
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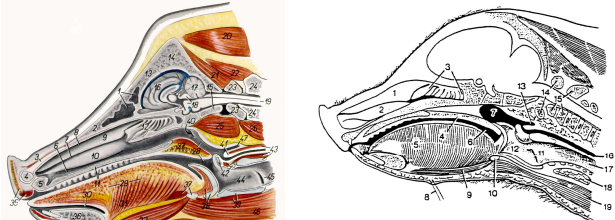
## Topics

- ▶ Lateral Saphenous IV Catheter
- ▶ Ovariohysterectomy
- ▶ Castration
- ▶ Inguinal Hernia
- ▶ Preputial Diverticulectomy
- ▶ Cryptorchidism
- ▶ Cesarean Section



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## Endotracheal Intubation Anatomy




**Figure 3.** The sagittal plane of the oral cavity and proximal respiratory system of swine. 1, Dorsal nasal concha; 2, ventral nasal concha; 3, ethmoidal conchae; 4, soft palate; 5, tongue; 6, oropharynx; 7, nasopharynx; 8, mental hairs; 9, geniopharynx; 10, basihyoid; 11, laryngeal ventricle; 12, larynx; 13, pharyngeal diverticulum; 14, atlas; 15, axis; 16, esophagus; 17, trachea; 18, thyroid gland; 19, sternothyroides. (From Dyce KM, Sack WO, Wensing C/JG (eds): Textbook of Veterinary Anatomy, ed 2. Philadelphia, WB Saunders, 1996, p 776, with permission.)

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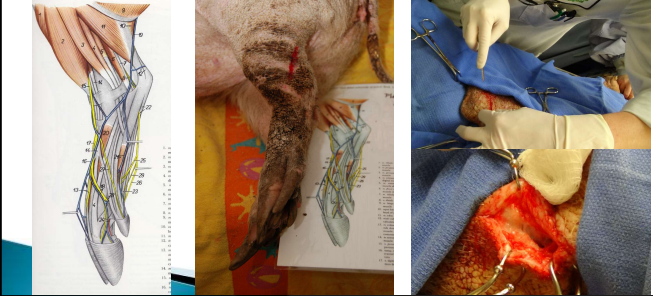
## Swine IV Catheterization

- ▶ Ear Veins
  - Great for domestic pigs
  - Much more difficult in Pot Bellied Pigs
- ▶ Cephalic Vein
  - Thick tough skin
  - Challenging
- ▶ Lateral Saphenous
  - Requires surgical cut down for access
  - Allows for long term catheter



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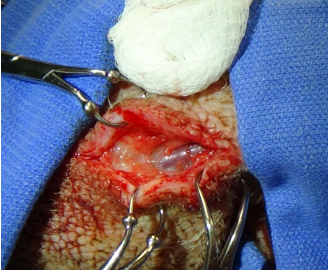
## Lateral Saphenous IV Catheter



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## Lateral Saphenous IV Catheter

- ▶ Dissect to isolate
  - Sharp and blunt
- ▶ Surprisingly deep
- ▶ Isolate and stabilize



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### Lateral Saphenous IV Catheter

Insert needle canula into vein      Start feeding wire through canula

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### Lateral Saphenous IV Catheter

Insert wire through needle canula      Run IV catheter over wire

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### Lateral Saphenous IV Catheter

Feed Catheter into vein      Suture in place and close skin

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### Lateral Saphenous IV Catheter

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### Ovariohysterectomy

- ▶ Pet Pigs
- ▶ No different than Dogs and Cats EXCEPT
  - Incision location more caudal
  - Length of uterine horns
  - Highly vascular mesentery

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### Ovariohysterectomy – Incision Location

- ▶ Between last two caudal teats

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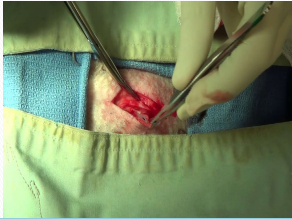
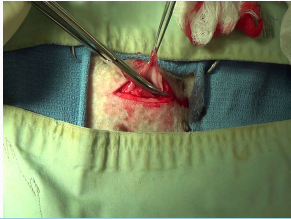
### Ovariohysterectomy

- Dissect to Linea alba



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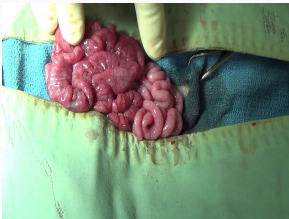
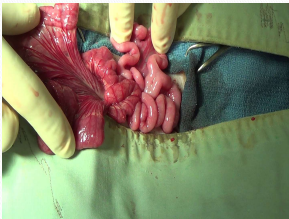
### Ovariohysterectomy

Open Peritoneum      Extend Incision



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### Ovariohysterectomy

Look First!      Note the difference between intestine and uterus


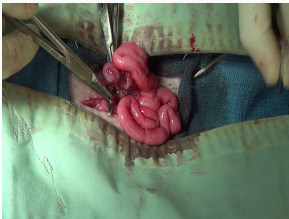
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Uterine horns can be quite extensive.      This belongs to the pig to the left.

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### Ovariohysterectomy

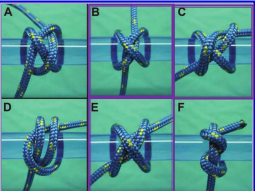



Identify Ovary      Isolate ovary, ±Clamp, Ligate

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### What is the Best Ligature?

- A. Ashley modification of the Miller's knot
- B. Constrictor Knot
- C. Miller's Knot
- D. Modified Miller's Knot
- E. Strangle Knot
- F. Surgeon's Throw



Hazenfield KM, Smeak DD. In vitro holding security of six friction knots used as a first throw in the creation of a vascular ligation. *J Am Vet Med Assoc* 2014;245:571-577.

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### Ovariohysterectomy

Ligate and transect mesentery

Mesentery is friable

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### Abdominal Closure

- Internal Rectus Sheath?
  - Not the major holding layer
- External Rectus Sheath
  - Primary holding layer
  - Synthetic Absorbable
  - Simple Continuous
  - Staggard Cruciate
- Subcutaneous Tissue
  - Simple Continuous
- Skin
  - Intradermal/Subcuticular

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### Ovariohysterectomy

Subcutaneous Layer

Skin Layer

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### Ovariohysterectomy

Tattoo

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### Ovariohysterectomy

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### Castration – Sensory Innervation

- Spermatic Cord, Testes, & Epididymis
  - Testicular n.
  - Originates from T10-L1 Vertebral Segments
  - Think embryological origins!
- Scrotum, Tunica Dartos, Spermatic Fascia
  - Genital branch of the Genitofemoral n. (L2-L4)
    - Innervates the cranio-lateral aspect of the scrotum.
    - Also provides motor to the cremaster muscle
  - Anterior Scrotal n. from the ilioinguinal n. (L2)
    - Innervates the cranial aspect of the scrotum
  - Perineal branches of the posterior femoral cutaneous n. (L4-S4)
    - Also innervates the caudal aspect of the scrotum
  - Posterior scrotal n. from the perineal n. (pudendal n. S4-Co)
    - Innervates the caudal aspect of the scrotum

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### Castration – Analgesia

- ▶ Systemic Analgesia & Sedation
  - Alpha-2 Agonist, Butorphanol, Morphine
  - Meloxicam, Flunixin Meglumine
- ▶ Epidurals
  - Lidocaine
  - Xylazine
- ▶ Local Infusion
  - Spermatic Cord
  - Scrotum & Spermatic Fascia
  - Testis
- ▶ General Anesthesia



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### Piglet Castration

- ▶ <2 Weeks Old
  - Manual Restraint
  - ± Local Block
  - Surgical Castration
- ▶ 2–12 Weeks
  - Commercial Pigs
  - Pet Pigs
- ▶ >12 Weeks
  - Sedation + Analgesia
  - General Anesthesia



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### Pre-Scrotal Surgical Castration

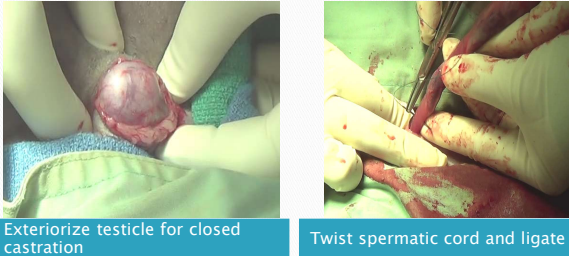


Positioning

Pre-scrotal incision near inguinal ring.

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### Pre-Scrotal Surgical Castration

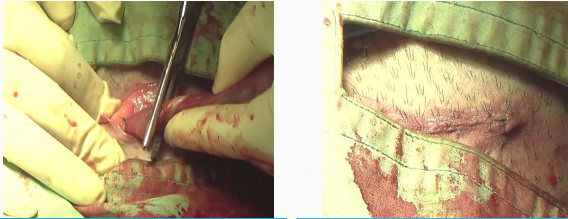


Exteriorize testicle for closed castration

Twist spermatic cord and ligate

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### Pre-Scrotal Surgical Castration




Using the ligature suture, partially close inguinal ring. Then clamp and remove testis

Close subcutaneous tissue. Intradermal skin closure

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### Large Boar Castration

- ▶ Much bigger undertaking!
- ▶ General Anesthesia
  - Injectable
  - Inhalation
- ▶ Consider Lumbosacral Block



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## Large Boar Castration

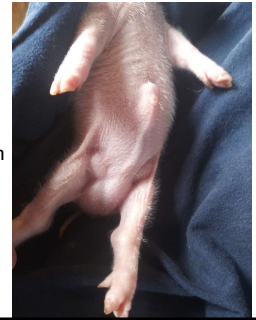
- ▶ Perioperative Analgesia
  - Meloxicam
- ▶ Antibiotics
  - Long acting injectable?
  - Oral sulfadimethoxine?
- ▶ Open vs Closed Castration
- ▶ Ligate (Strangle Knot) + Emasculator
- ▶ Leave scrotal incision open --- But!
  - Expect bleeding from disrupted soft tissue
  - They will swell BIG TIME!
  - Be patient and trust your work



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## Inguinal Hernia

- ▶ Swine are predisposed to inguinal hernias
  - Range 0 to 15%, expected ~1%
- ▶ Genetic predisposition
  - Heritability 29-34%
- ▶ May be present at time of castration
- ▶ May occur during or following castration



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## Inguinal Hernia at Castration

- ▶ Reason for Closed Castration technique
- ▶ Patient positioned in slight tilt with head downward
- ▶ Twist spermatic cord and vaginal tunic to force contents into abdomen
- ▶ Tack ligated spermatic cord into inguinal ring to form additional plug



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## Preputial Diverticulotomy

- ▶ Bilobed structure at distal prepuce
- ▶ Contains urine and secretions
- ▶ Diverticulitis
- ▶ Malodorous swelling
- ▶ May affect breeding soundness
- ▶ Can be performed at the same time as castration



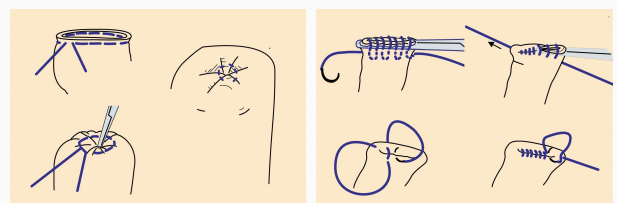
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## Three Different Procedures

- ▶ Closed Diverticulotomy
  - Approach through skin incision
  - Dissect bilobed diverticulum
  - Place purse string suture
  - Retract out end of prepuce
  - Tie off purse string suture and resect away diverticulum
  - Close skin incision
- ▶ Open Diverticulotomy
  - Same as above except instead of purse string closure of diverticulum, oversew it after retracted out the end of the prepuce.
- ▶ Rip and Tear Method (OUCH!)
  - Diverticulum retracted out through prepuce using curved hemostat and "gentle" traction.

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## Preputial Diverticulotomy Closure



Closed Technique: Purse String

Open Technique: Parker-Kerr  
(Cushing with Lembert oversew)

From: <https://www.gynecoloncol.com/surgical-and-medical-videos/common-suture-patterns-interrupted-continuous/>

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### Preputial Diverticulectomy (video)



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### Cryptorchid Castration

- ▶ Same approach as goats.
- ▶ Palpation
- ▶ Ultrasound
- ▶ Start with retained testis



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### Cryptorchid Castration



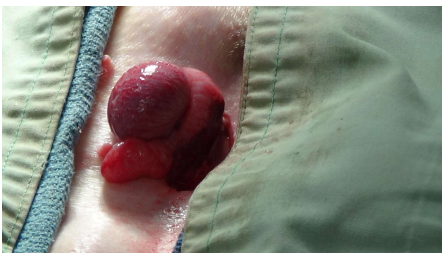
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### Cryptorchid Castration



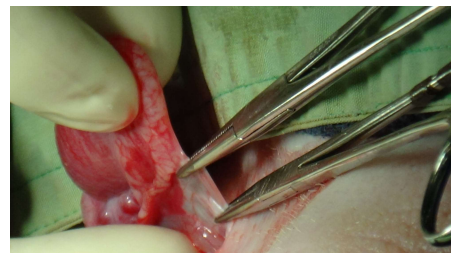
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### Cryptorchid Castration



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### Cryptorchid Castration



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### Pig Cesarean Section

- ▶ Normal Gestation 112–115 days
  - 109–112 premature
  - >116 prolonged → **DYSTOCIA!**
- ▶ Emergency
  - Examine and intervene as soon as possible
  - Delays significantly compromise dam and piglets

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### Always Provide Systemic Support

- ▶ Even if the sow looks OK, she can rapidly deteriorate
  - Shock
  - Hypoglycemia
  - Hypocalcemia
- ▶ Shock Bolus if indicated
  - 80–90 ml/kg given as ¼ boluses to effect
  - Add a 0 to the BW in pounds and that is a ¼ shock bolus
- ▶ Supportive IV Fluids
  - Rate ~4–5 ml/kg/hour
  - Dextrose 2%
  - Calcium Gluconate 23% @ 10 ml/L up to 1 ml/kg total

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### Pig Cesarean Section

General Anesthesia      IV Catheter

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### Pig Cesarean Section

FIGURE 4-13 Location of epidural in the pig. The position of an imaginary horizontal line connecting the center of the lumbar process (vertical line) and the tubercle (horizontal line) is the site of injection.

FIGURE 4-14 Location of epidural in the pig. The epidural catheter is inserted into the epidural space (red line) and the epidural space is sealed with the epidural tissue (blue line).

- ▶ Antibiotic
  - Cefiofur
  - Ampicillin (Polyflex)
  - Oxytetracycline
- ▶ Flunixin Meglumine
  - 1 mg/kg IV

Additional Meds

Epidural: Lidocaine 20% @ 1–2 mg/kg (0.05–0.1 ml/kg) not to exceed 20 ml

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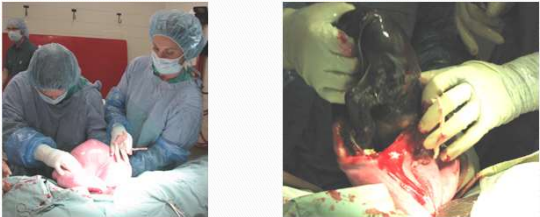
### Pig Cesarean Section

Left Flank vs Midline      Routine Approach

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### Pig Cesarean Section



Exteriorize to mid horn or closer to bifurcation if possible

Attempt to remove all piglets through same uterine incision

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### Pig Cesarean Section




Uterine Closure: Utrecht Pattern

Routine Abdominal Closure

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### Pig Cesarean Section



Supplemental O<sub>2</sub>


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### Pig Cesarean Section



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### Questions



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