Simulation and Clinical Skills at University of Copenhagen

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Learning clinical skills

- Requires repetitive practice
- Requires a positive learning environment without undue stress
- Requires feedback

Assessment of skills

- Requires uniform opportunities

Learning in the clinical environment

- Apprenticeship model no longer feasible
  - Increasing student numbers
  - Referral level patients
  - Busy and stressful
- Live animal training often not desirable

Clinical skills training - out of the clinic

- Simulating the clinical situation
- Stress-free environment
- Repetitive practice
- Consistent, accessible training
- No harm to live animals

Simulation in veterinary clinical skills training

- Simulation games
- Role play
- Cadavers
- Low and high fidelity models

Set-up of simulation training

- Clinical Skills Lab (CSL)
  - Designated area
  - Open access OR integrated in specific courses
- Individual use of simulators/simulation
  - Using single simulators/simulation in specific courses

Simulation training – teaching benefits

- Skills can be taught to all students in a standardised way
- Learning outcomes can be mapped
- Standardized assessment using validated methods e.g. OSCE
- Should be integrated into the curriculum (Optimally)

The Surgical Skills Lab – Implemented in 2007

Challenges in surgical training

- Novice surgeon → proficient: Students need to practise*
- High anxiety levels when performing on live animals**
- High anxiety levels are detrimental to learning***

- Poor learning outcome
- Un-ethical use of live research animals

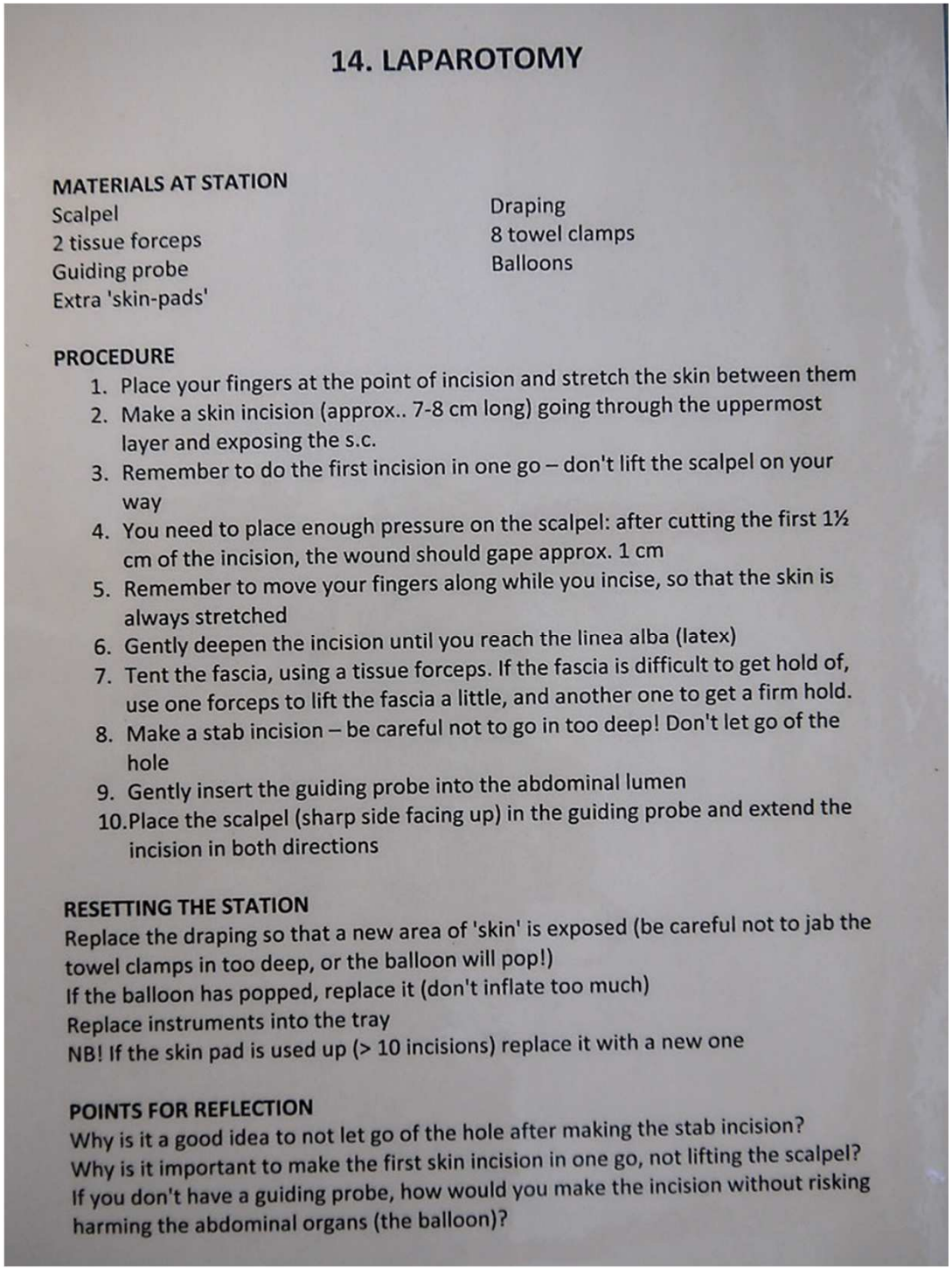
*Ericsson (2004)
** Langebaek et al (2012)
***Illeris (2006); Illeris(2004);Beylefield & Struwig(2007); CERI (2007); Dohn et al (2009); Eysenck (1979); Fredrickson (2005); Gläser-Zikuda et al (2005); Isen et al (1985); Isen et al (1991); Isen (2001); Konradt & Hoffmann (2003); Reschly et al (2008); Sappington (1984); Evans & Gerlach (2007); Gade (1997); Sylwester (1994)

The Surgical Skills Lab

- Integrated into a Basic Surgical Skills course
- Low-fidelity toy animal simulators
- Cadavers

The SSL

- 17 stations
- Instructions
  - Materials at station
  - Procedure
  - Resetting the station
  - Points for reflection
- 2 teachers
- 1 tutor



14. LAPAROTOMY

MATERIALS AT STATION

Scalpel
2 tissue forceps
Guiding probe
Extra 'skin-pads'
Draping
8 towel clamps
Balloons

PROCEDURE

1. Place your fingers at the point of incision and stretch the skin between them
2. Make a skin incision (approx.. 7-8 cm long) going through the uppermost layer and exposing the s.c.
3. Remember to do the first incision in one go – don't lift the scalpel on your way
4. You need to place enough pressure on the scalpel: after cutting the first 1½ cm of the incision, the wound should gape approx. 1 cm
5. Remember to move your fingers along while you incise, so that the skin is always stretched
6. Gently deepen the incision until you reach the linea alba (latex)
7. Tent the fascia, using a tissue forceps. If the fascia is difficult to get hold of, use one forceps to lift the fascia a little, and another one to get a firm hold.
8. Make a stab incision – be careful not to go in too deep! Don't let go of the hole
9. Gently insert the guiding probe into the abdominal lumen
10. Place the scalpel (sharp side facing up) in the guiding probe and extend the incision in both directions

RESETTING THE STATION

Replace the draping so that a new area of 'skin' is exposed (be careful not to jab the towel clamps in too deep, or the balloon will pop!)
If the balloon has popped, replace it (don't inflate too much)
Replace instruments into the tray
NB! If the skin pad is used up (> 10 incisions) replace it with a new one

POINTS FOR REFLECTION

Why is it a good idea to not let go of the hole after making the stab incision?
Why is it important to make the first skin incision in one go, not lifting the scalpel?
If you don't have a guiding probe, how would you make the incision without risking harming the abdominal organs (the balloon)?

The Surgical Skills Lab

Station no.1. Intravenous catheterisation

Materials

- Toy dog with artificial Vena cephalica (silicone tube) covered by ‘skin’ (nylon stocking). Vessel supplied with artificial blood by infusion

Intravenous catheterisation, pig

The Surgical Skills Lab

Station no.2. Preparation and draping + incision lines

Materials

- Toy dog with a 'skin tumor' placed on lateral side of thorax and covered with clear plastic

The Surgical Skills Lab

Station no.3. Preparation of surgeon

Materials

- Caps, sterile gowns, gloves and sponges

The Surgical Skills Lab

Station no.4. Behaviour in the Operating Room

Materials

- Video – OR situations
- Written assignment: 'Find 5'

The Surgical Skills Lab

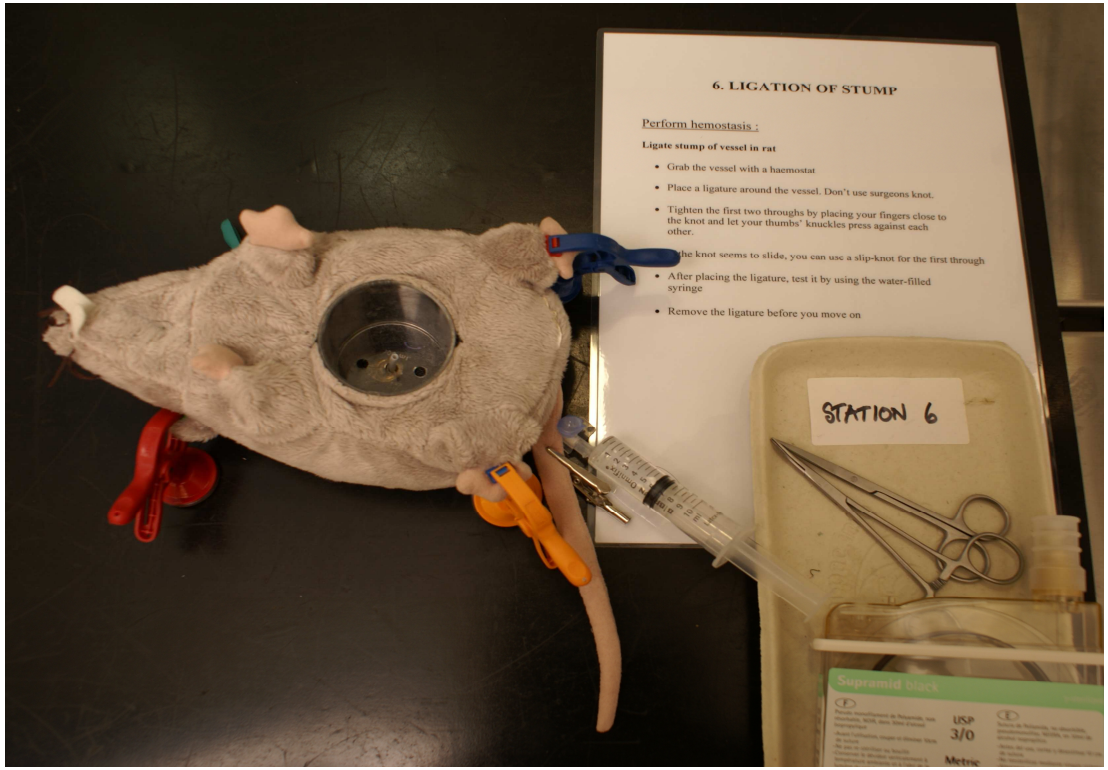
Station no.5. Hand ties

Materials

- Toy rat/bat. Blue and green string supplied through holes in the ‘body’

The Surgical Skills Lab

Station no.6. Ligation of stump



Materials

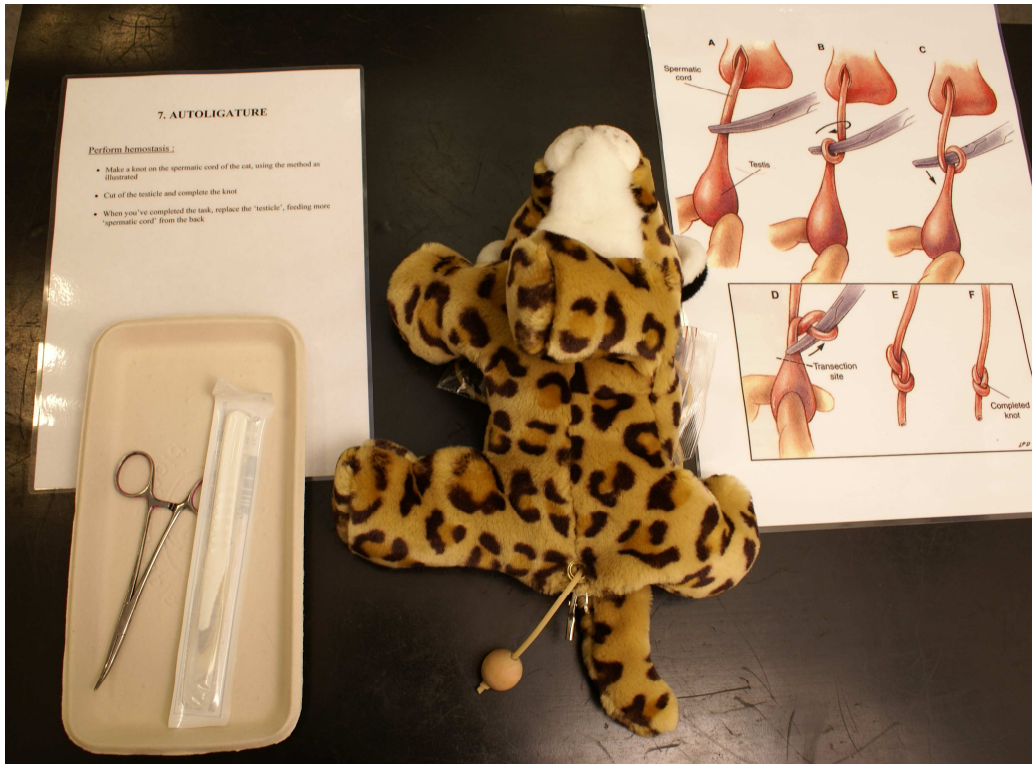
- Toy rat with a (silicone) stump of 'vessel' placed deep inside a narrow abdomen. A water-filled syringe is connected to the opposite end of the tube

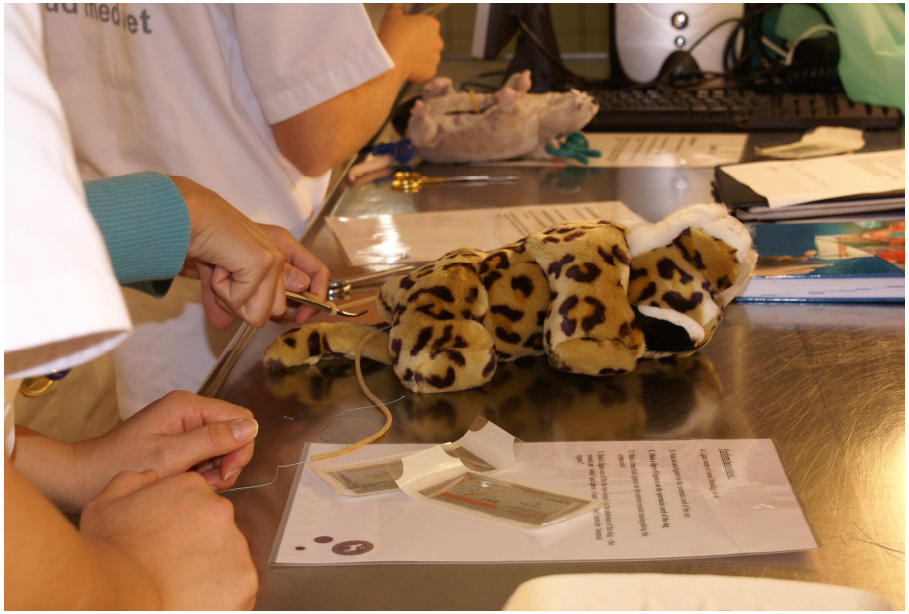
The Surgical Skills Lab

Station no.7. Autoligature (Orchiectomy, cat)

Materials

- Toy cat with a spermatic cord (rubber tube) and testicle (wooden bead)



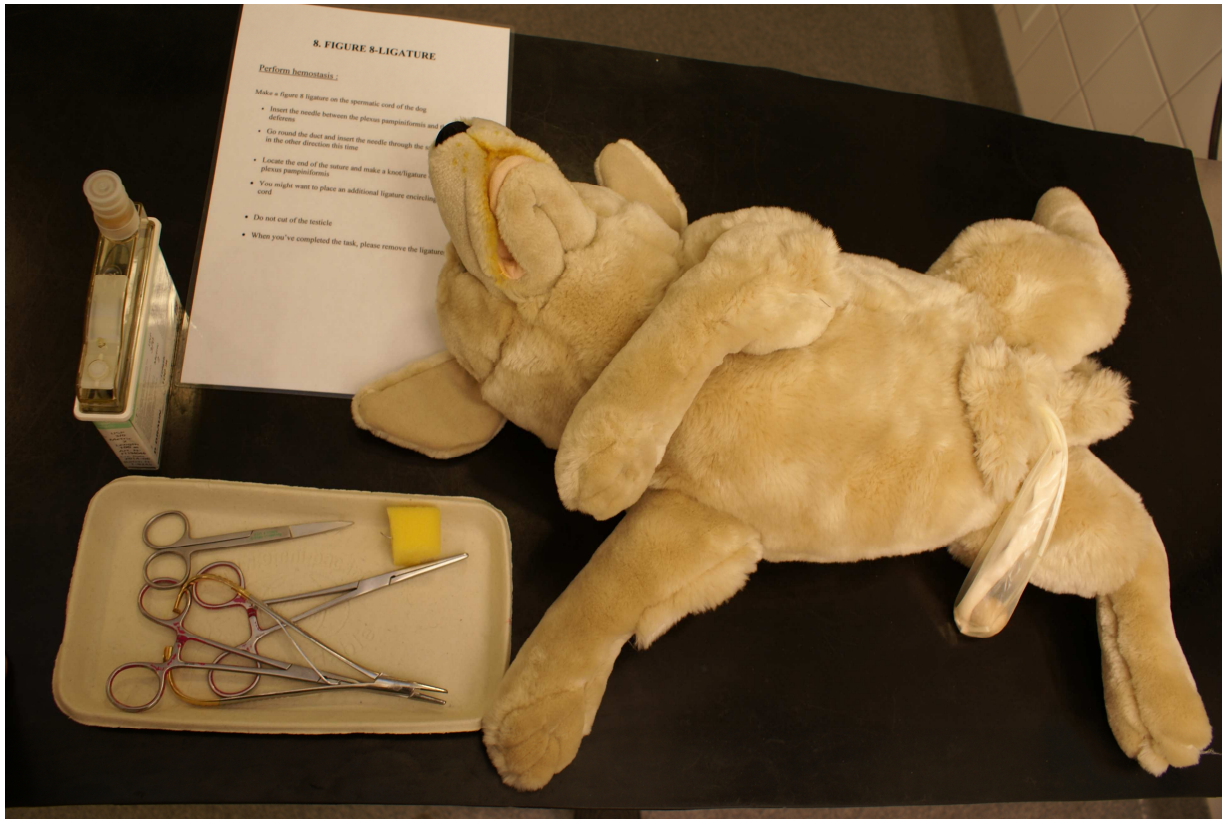


The Surgical Skills Lab

Station no.8. Fig.-8 ligature (Orchiectomy, dog)

Materials

- Toy dog with a Tunica vaginalis (condom), plexus pampiniformis (balloon with corn flour) and a ductus deferens (silicone tube)

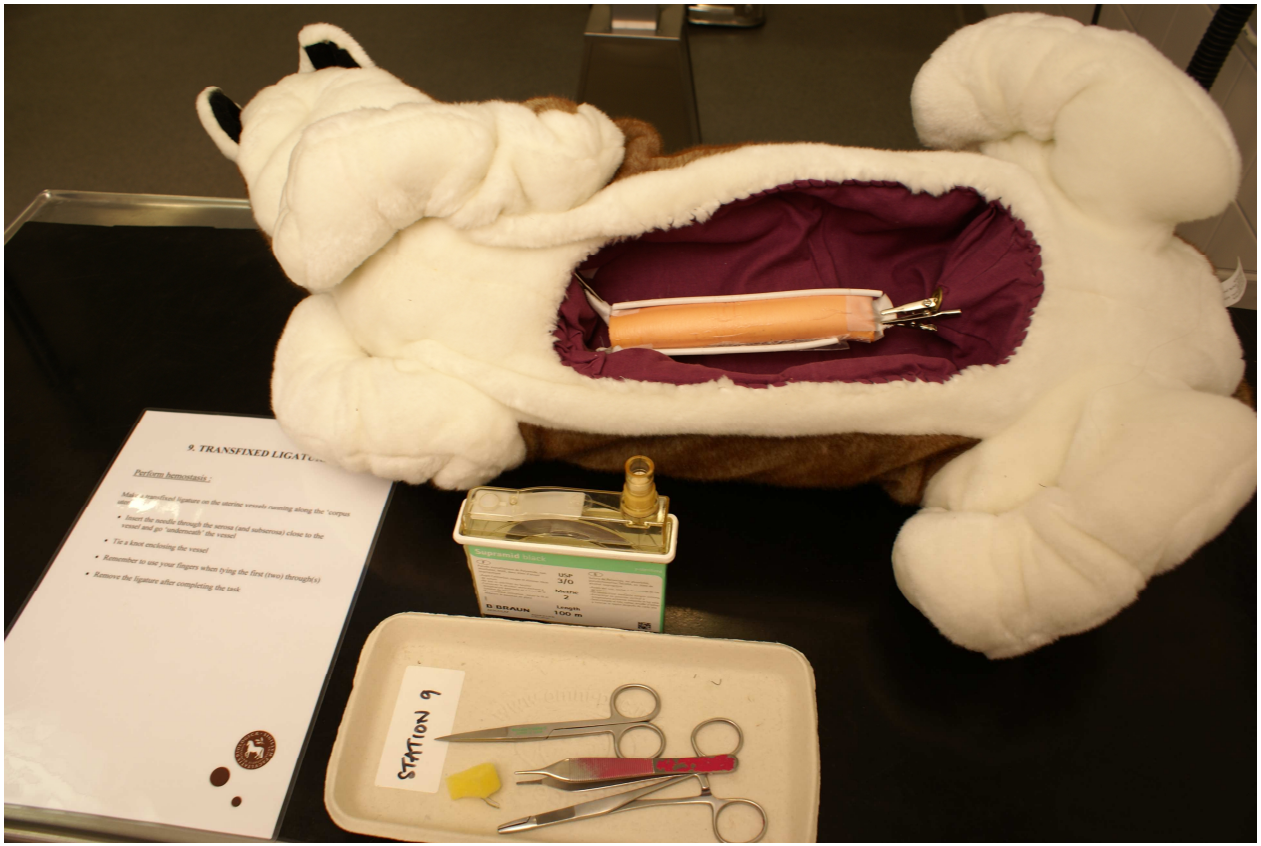


The Surgical Skills Lab

Station no.9. Transfixed ligature ('Uterus', dog)

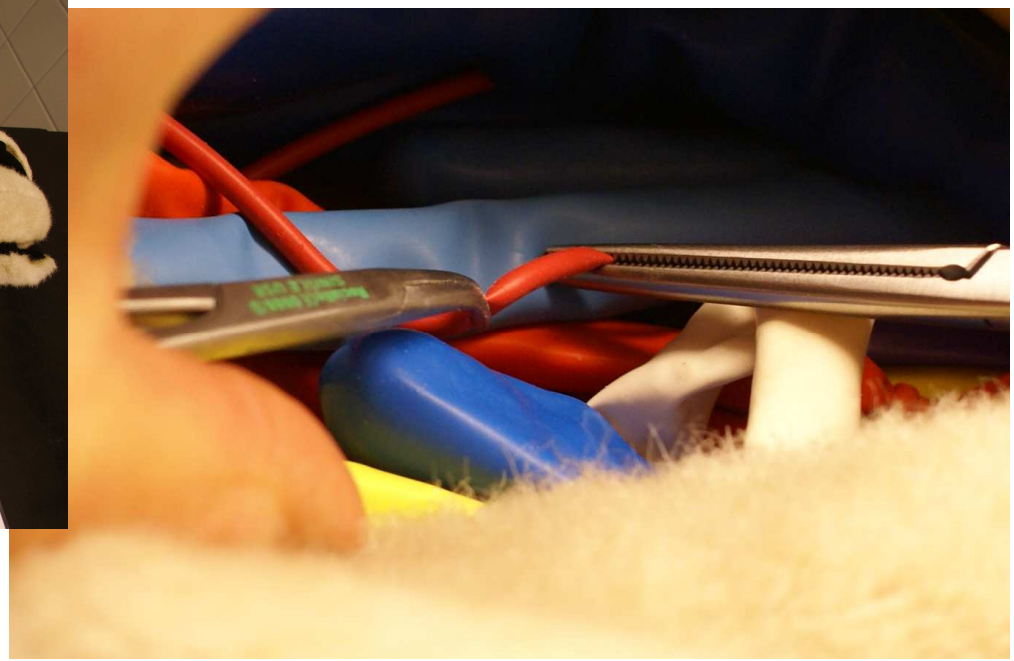
Materials

- Toy dog with a uterus (polyurethane) and uterine vessels (silicone tubes)



The Surgical Skills Lab

Station no.10. Double ligature in abdomen



Materials

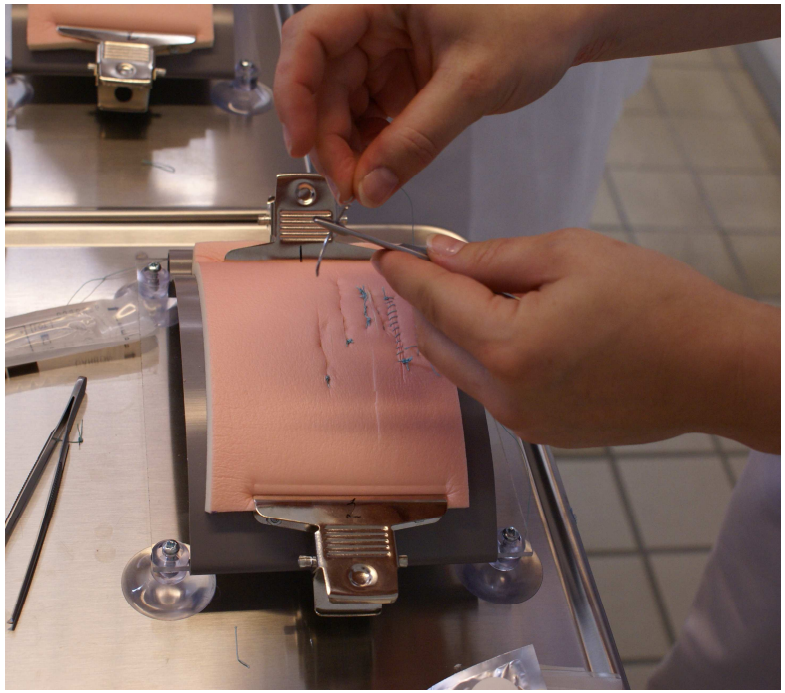
- Toy dog with two large vessels placed deep inside the abdomen which is packed with ‘viscera’ (flour-filled and water-filled balloons)

The Surgical Skills Lab

Station no.11. Knotting and suturing technique

Materials

- Polyurethane fixed in holders

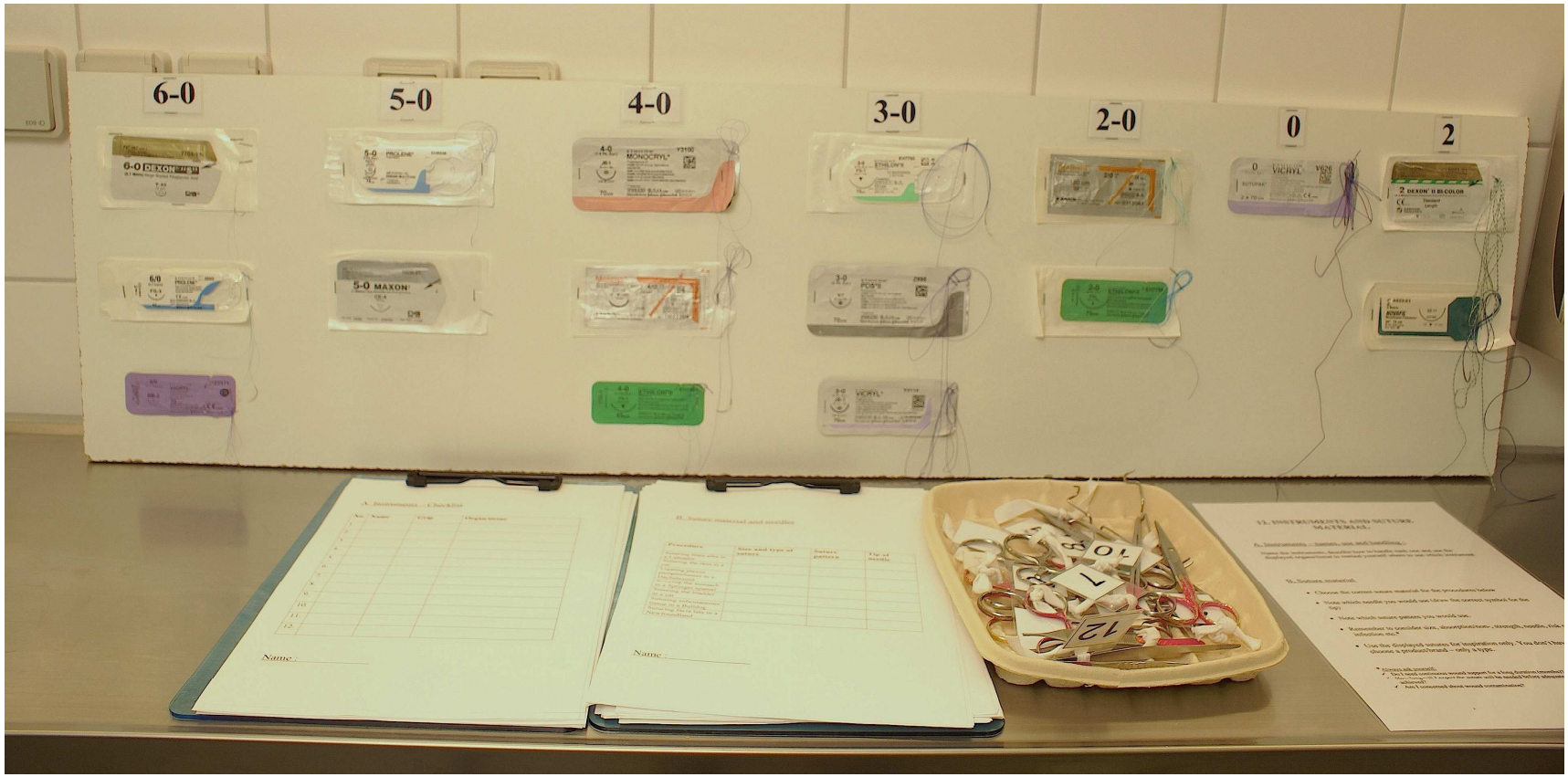


The Surgical Skills Lab

Station no.12. Instruments and suture materials

Materials

- Numbered instruments. Suture packages for illustration
- Written assignment



The Surgical Skills Lab

Station no.13. Drainage

Materials

- Toy dog with abcess (double layered latex plus mayonnaise) placed on the shoulder

The Surgical Skills Lab

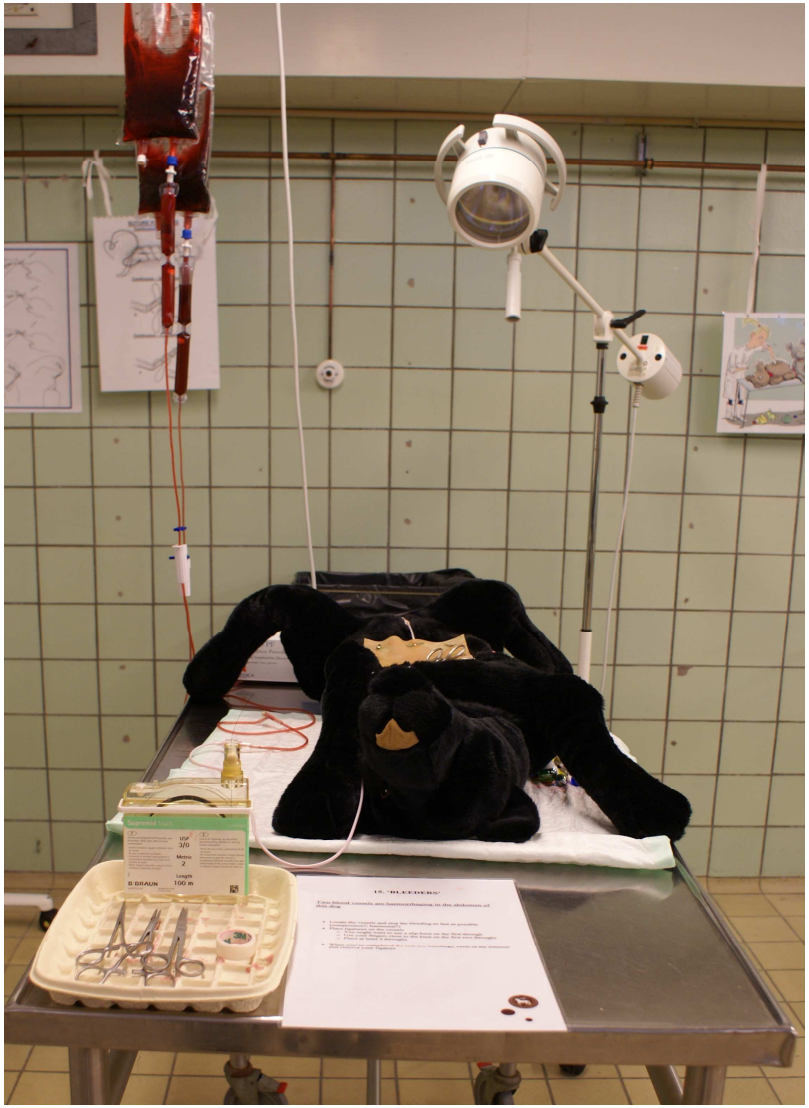
Station no.14. Laparotomy

Materials

- Toy dog with an air-filled balloon placed in the abdomen and covered by ‘skin’, ‘sub-c’ and ‘fascia’ (polyurethane and latex)

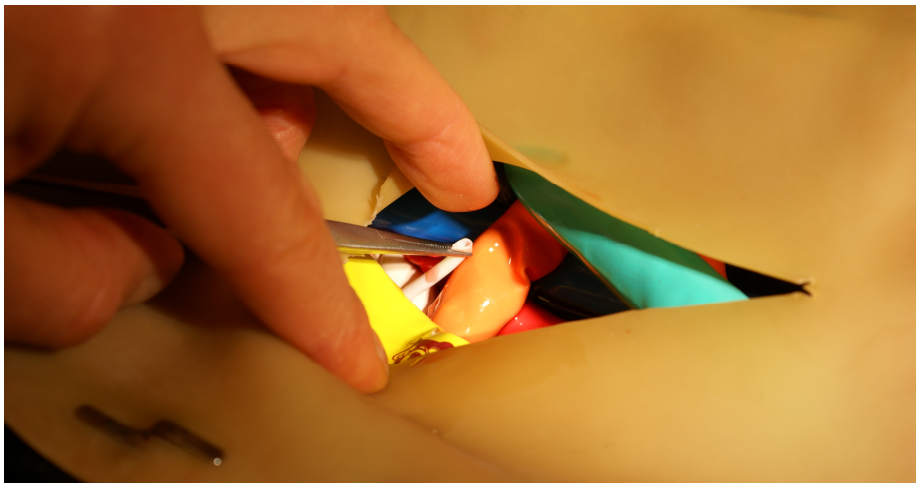
The Surgical Skills Lab

Station no.15. Bleeders



Materials

- Toy dog with two vessels (silicone) placed in a covered abdomen. Vessels are supplied with 'blood' by infusion. Abdomen is filled with viscera (flour filled balloons)



The Surgical Skills Lab

Station no.16. Injection technique

Materials

- Toy dog with pliable, elastic 'skin' for s.c. injection. Toy dog with palpable, anatomical bone structures and 'muscle' for i.m. injection

Conclusion

Implementation of The Surgical Skills Lab prior to live animal surgery has been a success

- The models are considered useful educational tools prior to live animal surgery*
- Training on models in the Surgical Skills Lab reduces anxiety before live animal surgery**
- Training a skill on a simulator/model increases student self-efficacy***
- For training basic skills, the low-fidelity models fulfill their purpose*
- Improved learning outcome
- A more ethical use of research animals

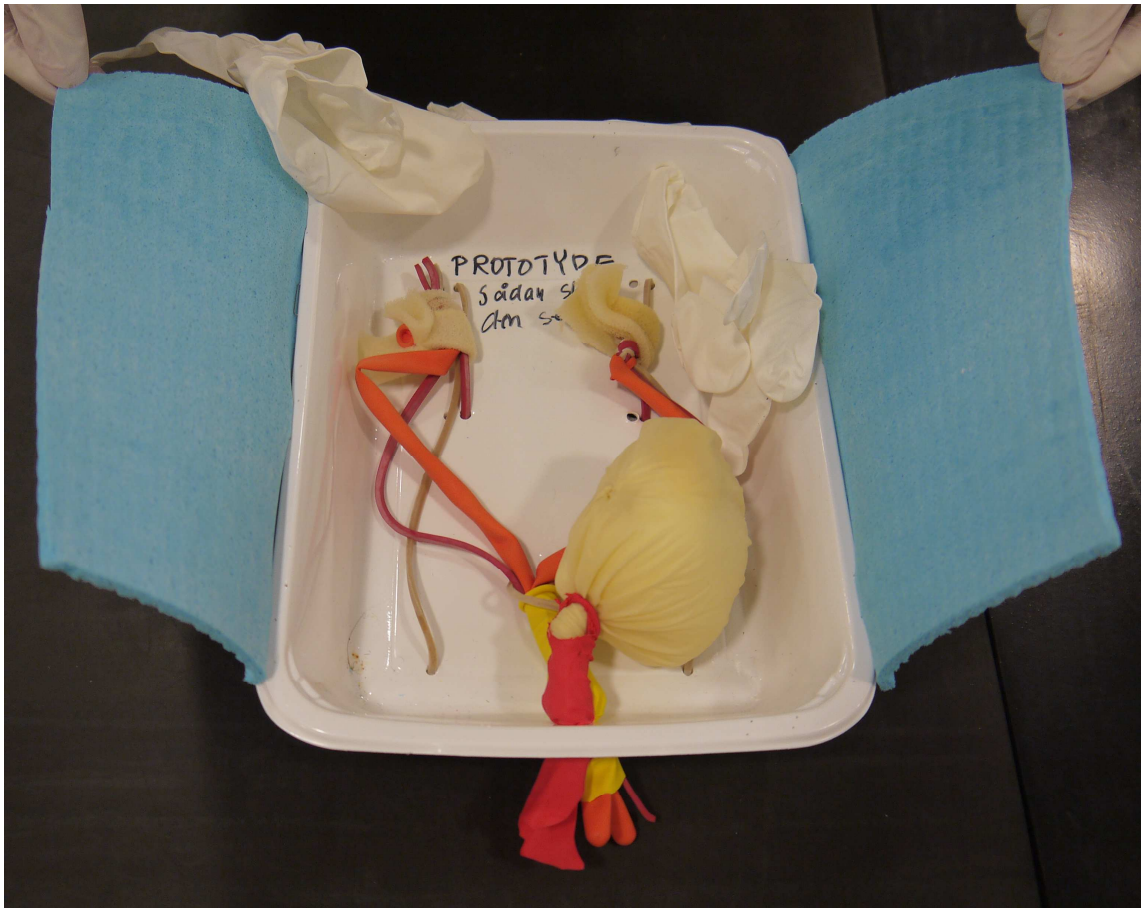
*Langebaek et al, VetRec (2012)
** Langebaek et al, JVME (2012)
*** Langebaek et al, JVME (2015)

Simulation at University of Copenhagen

- The Surgical Skills Lab (SSL)

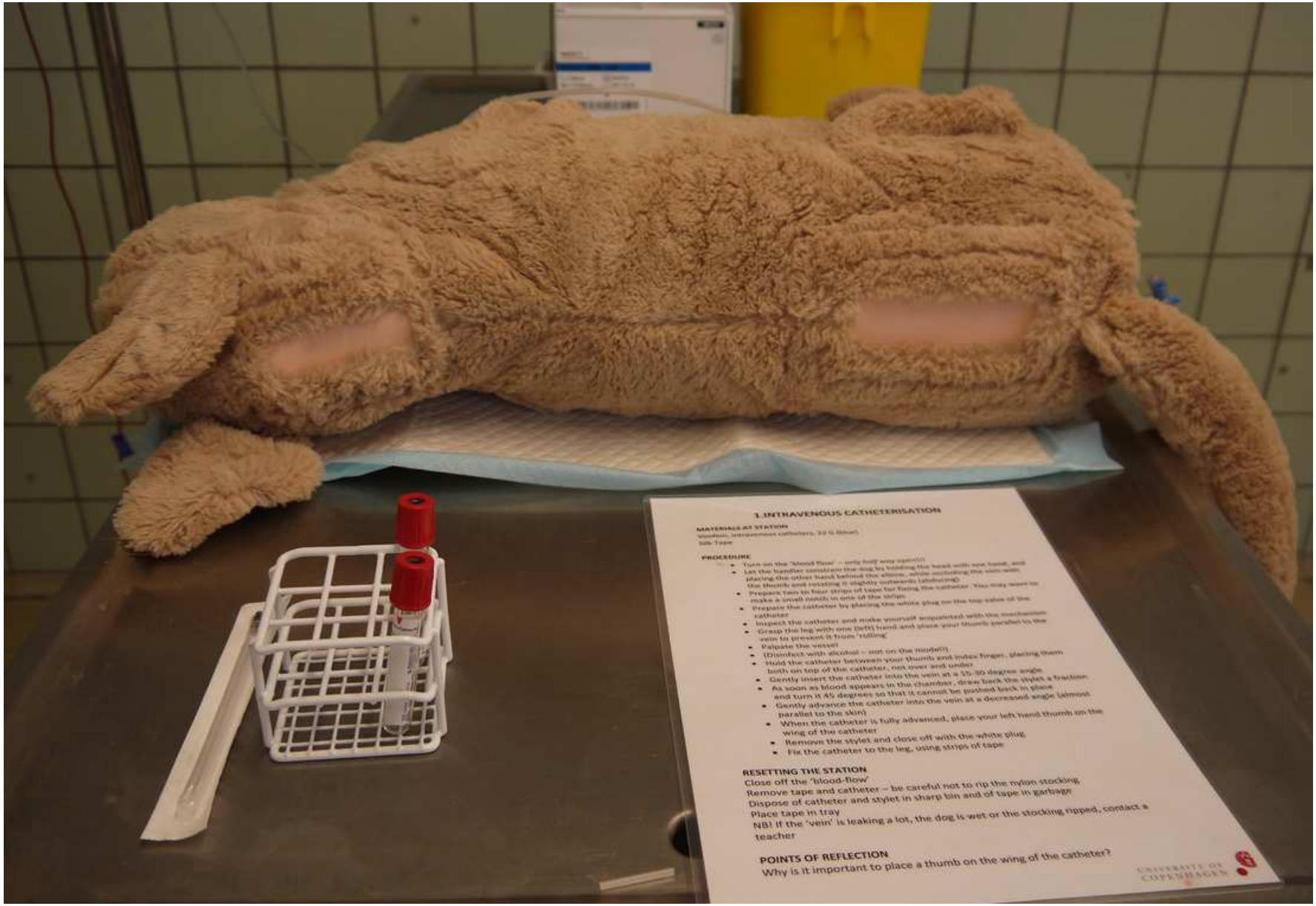
- Individual simulation
  - Companion Animal surgery – SimSpay
  - Specialty surgery – suturing, joint incision (cadavers)
  - Emergency practise – Caesarian section simulator
  - Communication skills - Role play
  - Clinical examination – privately owned dogs
  - Radiology - positioning simulator
  - Neurology – CSF collection simulator
  - Anaesthesiology – intubation simulator
  - Internal medicine – cadavers (injection,probes,tubes)

The SimSpay



The Caesarian Section simulator

The CSF simulator



Toy Animal Simulators

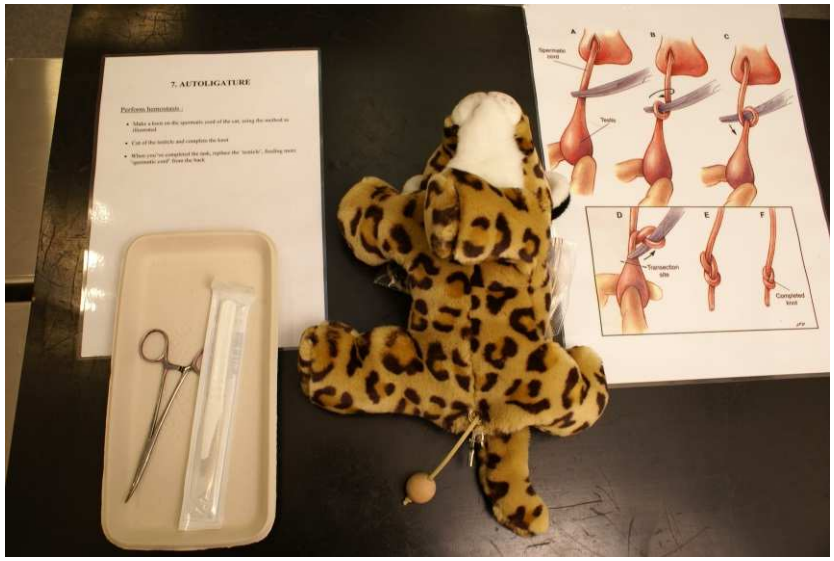
Low fidelity versus high fidelity?*

A matter of context

- Simple skills

versus

- Advanced procedures



Veterinary Simulator Industries

*Kneebone (2005); Bradley (1999); Davoudi et al (2010); De Giovanni et al (2009);Grober et al (2004); Matsumoto et al (2002); Langebaek et al (2011)

Thank you for your attention!