



# Better Training for Safer Food *Initiative*

Training course on “Animal Welfare in pig production”

Mutilation procedures: welfare  
implications and new strategies

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**SRUC**

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Herning, Denmark, 14<sup>th</sup>-17<sup>th</sup> Oct, 2014

# Content

## Directive 2008/120/EC

### Painful operations in animals

- **Castration**
  - New strategies
- **Tail Docking**
  - New strategies

BTSF

# The relevant European context

## Council Directive 2008/120/EC

minimum standards for the protection of pigs

### Scope

**Minimum standards apply to all categories of pigs kept for rearing and fattening:**

- Piglets (from birth to weaning)
- Weaned piglets (from weaning to 10 weeks old)
- Fatteners (more than 10 weeks old), sows and gilts, boars.

## Council Directive 2008/120/EC

### Painful operations on animals

***A veterinarian or “carer”, trained in aspects relating to animal welfare is authorised to carry out the following:***

- Reduction of piglets’ corner teeth
- Docking of tails\*
- Castration of males\*
- Nose-ringing in outdoor husbandry systems.

**\* before 7th day of life (or after this age if carried out by a veterinarian and under anaesthesia and with additional prolonged analgesia)**

## Council Directive 2008/120/EC

### *Paragraph 8 of Chapter 1 of Annex I*

**Neither tail-docking nor reduction of corner teeth must be carried out routinely**

- only where there is evidence that injuries to sows' teats or to other pigs' ears or tails have occurred.

**Before carrying out these procedures,**

- other measures shall be taken to prevent tail-biting and other vices, taking into account environment and stocking densities.
- Inadequate environmental conditions or management systems must be changed.

# Council Directive 2008/120/EC

## Implications for Animal Welfare

- Tail-docking, tooth clipping and tooth grinding are likely to cause immediate pain, and some prolonged pain to pigs.
- Physical castration is likely to immediate pain and some prolonged pain which is worse if there is tearing of the tissues.
- These practices are detrimental to the welfare of pigs, especially when carried out by incompetent and inexperienced persons.

## Surgical castration

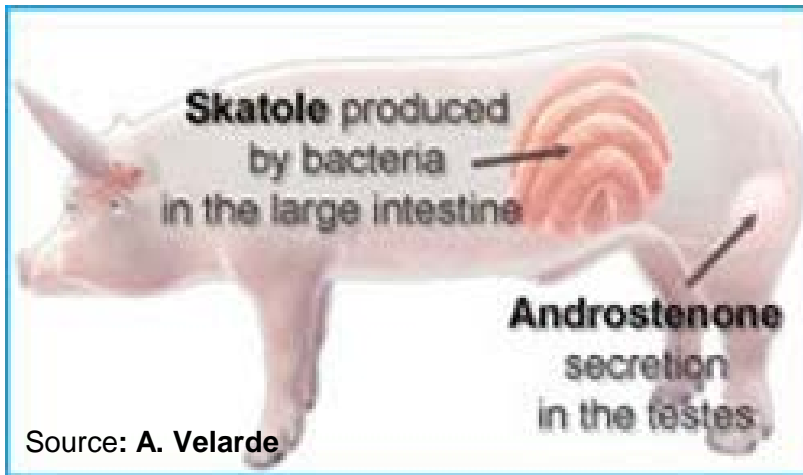


*80% of male piglets (100 million) are castrated in the EU each year (PIGCAS 2008).*

- Reduce aggression and sexual activity
- Prevent **“boar taint”**

An unpleasant taint (odour, taste and flavour) perceived in pork and pork products during cooking and eating.

# Boar taint



## Androstenone

- male sex pheromone
- Produced in Leydig cells in testes
- Accumulates in adipose tissue
- Secreted in urine and saliva

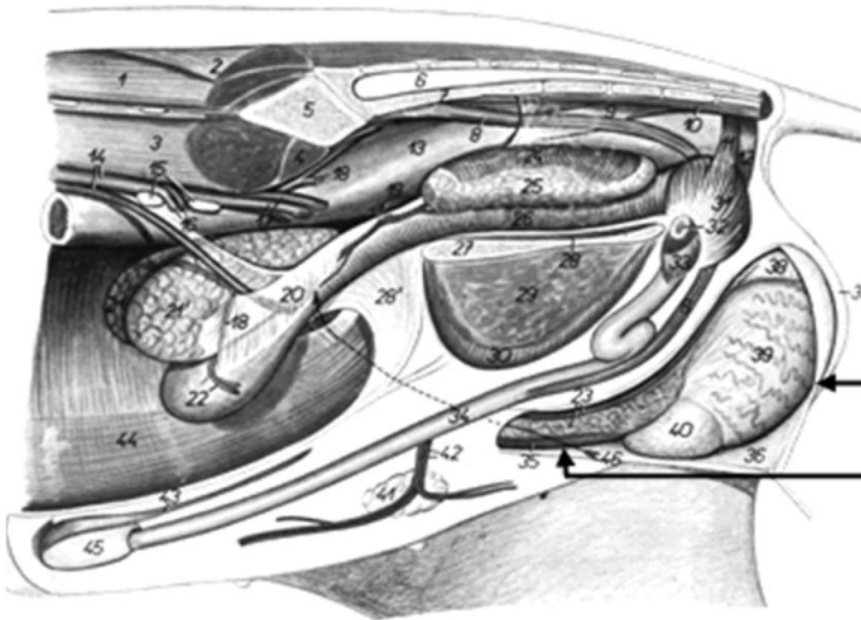
## Skatole

- Dietary tryptophan breakdown product
- Produced by bacteria in large intestine
- Accumulates in adipose tissue
- Excreted in urine

*In the absence of normal functioning testes, boar taint is virtually eliminated*



# Surgical castration



Adapted from Prunier et al 2005

*The most common type of castration procedure performed in the EU (79% of male pigs – EU27)*

## Procedure

- 1) Incision of the scrotum
- 2) Cut/tear of spermatic cord

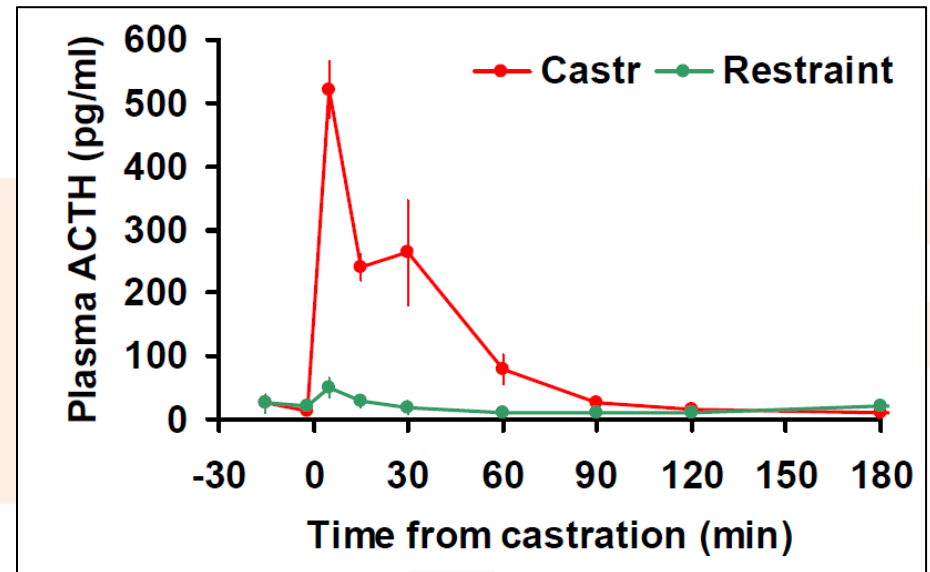
## Welfare implications: (EFSA 2004)

- Induces physiological and behavioural reactions indicative of pain.

# Surgical castration

## *Physiological indicators of pain*

- Immediate activation of adrenal and sympathetic axis
- Increase in heart rate

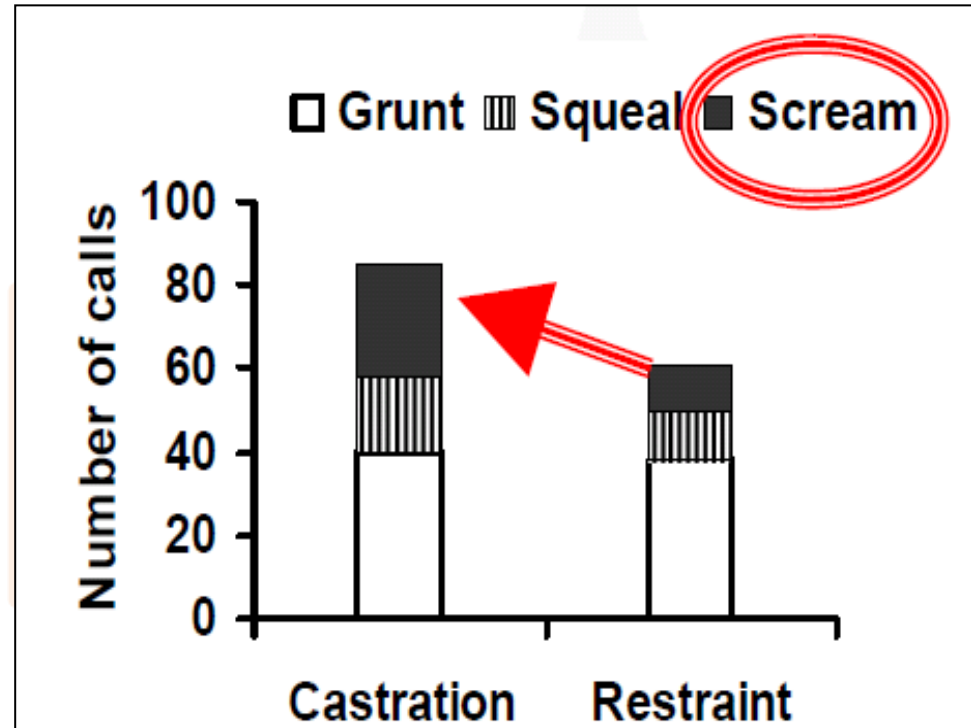


Adapted from Prunier et al 2005

# Surgical castration

## Immediate pain-related behavioural indicators

- High frequency vocalisations
- Increased physical resistance to movement



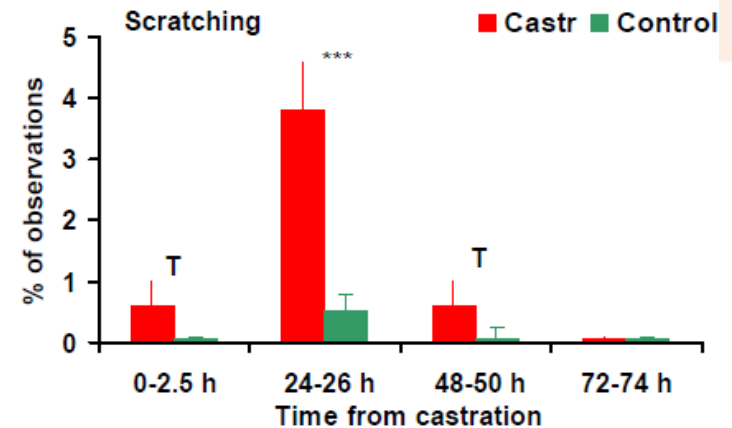
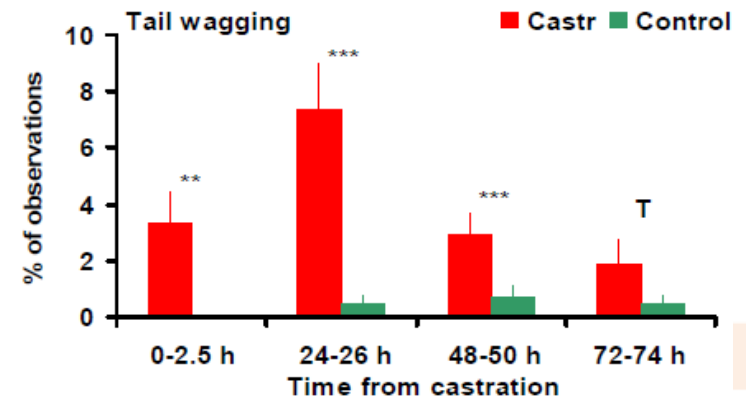
Adapted from Marx et al 2003

## After surgical castration

Post surgical pain can last for 5 days

### Behavioural alterations

- Less activity and locomotion
- More trembling and spasms
- Huddling up
- Scratching and rubbing of the rump
- Avoidance of litter mates (e.g. isolation /desynchronised behaviours)
- Immunosuppressive effect of castration?



*Hay et al. 2003*

## Alternatives to Surgical castration

- **Surgical castration with anaesthesia/analgesia**
- **Production of entire males**
  - slaughtering at a younger age
- **Immunocastration**
- **Sperm sorting**

# Surgical castration (with anaesthesia/analgesia)

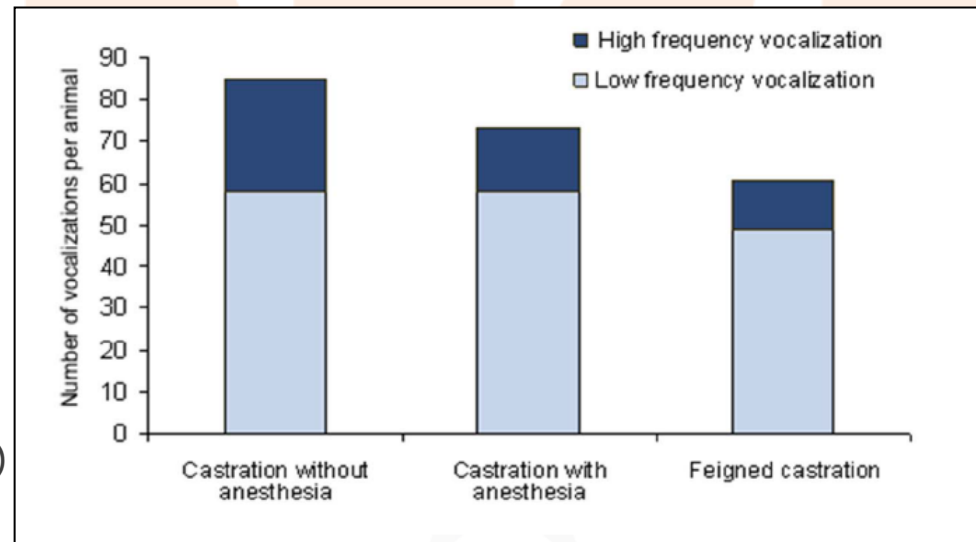
*EU Aim – voluntary end of surgical castration of pigs in Europe by Jan 2018 (EFSA, 2004)*

## *First step (from Jan 2012)*

- Castration should be performed with prolonged analgesia and/or anaesthesia.

## Local anaesthesia

- Injection of lidocaine into the testis and/or spermatic cord
- Reduces acute pain
- Less stressful (reduced cortisol/ACTH) post-castration



# Surgical castration (with anaesthesia/analgesia)

## 2) General anaesthesia

**Injection:** ketamine/azaperone + meloxicam (Schmidt et al., 2012)

- Reduction in post-castration pain
- May impair short-term suckling behaviour

**Inhalation:** Isoflurane + meloxicam (Shultz et al., 2007)

- Reduces castration pain.
- Long periods of sedation increased risk of death by hypothermia and crushing

**Currently no validated protocols in EU for:**

- Use of long-lasting analgesics which could be applied to commercial herds
- GA for pigs undergoing castration in commercial farms.

## Production of entire males

- Castration is not normally carried out in Ireland and UK
- Slaughter at less than 100 kg (before sexual maturity)

Advantages	Disadvantages
Greater alimentary efficiency	Increased aggression/mounting
Leaner carcasses	More carcass damage
Increased PUFA content	Greater incidence of DFD meat
Lower nitrogen excretion	Lower profitability
Lower production costs	Increase incidence of boar taint



# Production of entire males

## Management of boar taint (pre-slaughter)

- **Slaughter at lower weight**
  - Risk reduced but not completely removed
- **Housing**
  - Skatole from soiled floors absorbed through skin
- **Nutrition**
  - High energy feed increases risk
- **Genetics**
  - Both factors have medium to high heritability
  - Genetic markers
  - Delay sexual maturity

## Production of entire males

### Control of Boar taint (post-slaughter)

- **Sensor array based detection systems– “electronic-noses”**
  - Still in developmental stages
- **Laboratory based assays for androstenone and skatole**
  - ELISA/Colorimetry: inconsistent/time consuming/costly

**Presently no method available for assessing boar taint on the slaughter line**

# Immunocastration Vaccine (e.g. Improvac)

Immunization of young male pigs  
against gonadotropin releasing  
factor (GnRF)

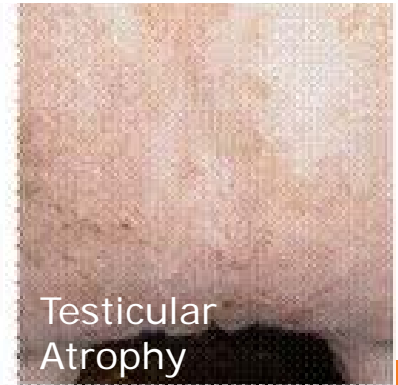
- Antibodies neutralize the GnRF
- Block the release of sex hormones
- Causes testicular atrophy
- Reduction in compounds associated with boar taint



Source: A. Velarde



Intact



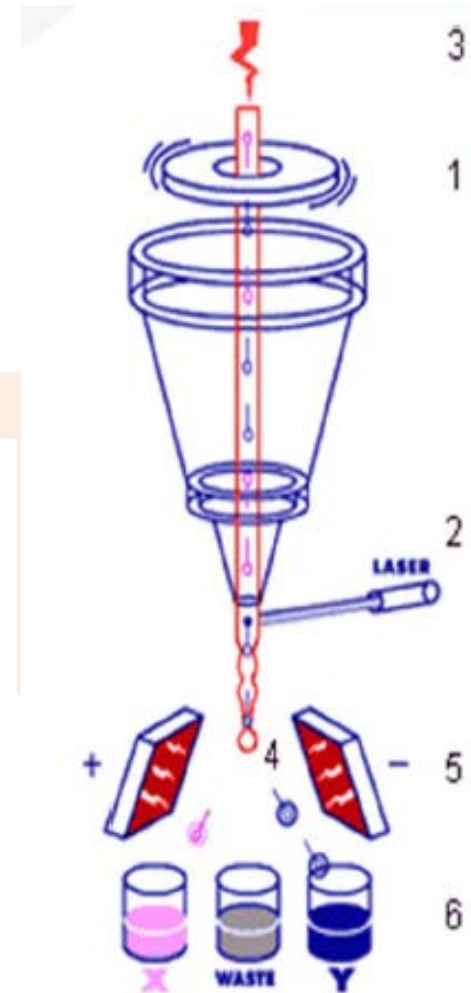
Testicular  
Atrophy

Source: Ulla Schmidt

# Spermatic selection

## Sexing of spermatozoids

- Producing only females
- Flow cytometry
  - Detection and sorting of spermatozoids
  - Difference in size of DNA of X and Y chromosomes.



## Tail docking



**Over 95% of pigs are still being tail docked in the EU (EFSA, 2007)**

**Prevent injury and production losses associated with the abnormal behaviour of tail biting**

- **Tail docking must not be carried out routinely**
  - Only where evidence of injuries
  - Before resorting to TD, other measures shall be taken to prevent tail biting
  - Inadequate environmental conditions/management system must be changed

# Tail docking

## Welfare implications

### Acute responses indicative of pain

- Tail flicking (multi-directional)
- Tail jamming (clamping tail stump between hind limbs)
- High frequency vocalisations

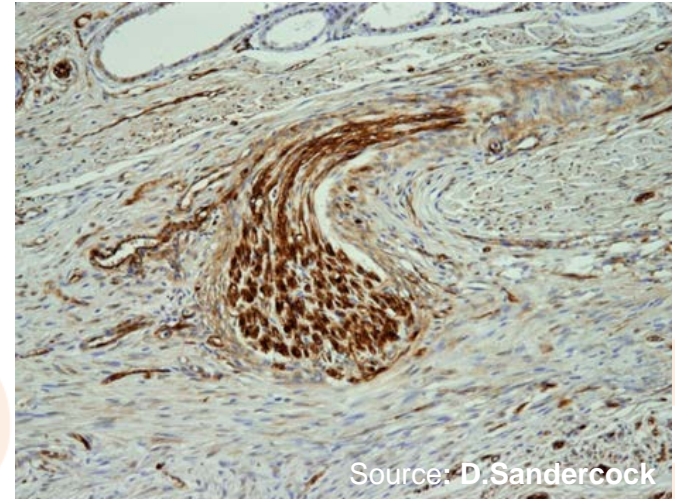


# Tail docking

## Welfare implications

### Long-term pain?

- Prolonged pain from traumatic neuroma formation in tail stump?



### EU FareWellDock project – Jan 2014

- Traumatic neuromas
- Functional nerve studies
- Nociceptive thresholds
- Peripheral/spinal neuronal changes – gene/protein expression





# Tail biting

## Exploratory behaviour

- In natural conditions pigs spend up to 50% of time performing exploratory behaviours

## In some indoor systems

- Pens with concrete or slatted floors restrict ability to perform foraging behaviour
- This can lead to redirected exploratory behaviour that leads to tail biting
- The aetiology of tail biting is complex and multi-factorial





# Tail biting – risk factors

## Redirected exploratory behaviour

**Absence of straw or similar substrate**



**Redirected behaviour (initial phase)**

- Slatted flooring
- Competition for feed
- High stocking density
- High temperature



- Dietary deficiency of essential amino acids
- Imitation
- Inadequate ventilation



**SERIOUS TAIL BITING**

## Before carrying out tail docking

- **Provide permanent access to a sufficient quantity of material to enable proper investigation and manipulation activities**
  - straw, hay, wood, sawdust, mushroom compost, peat
- **Review the composition of the feed**
- **Review environmental conditions**
- **Separate out animals with existing tail wounds**

# Thank you for your attention

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