



# 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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# BT SF

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**Malmo, Sweden, 11-14 April, 2016**



# Content

## Directive 2008/120/EC

Painful operations in animals

- Tooth resection
- Castration
  - New strategies
- Tail Docking
  - New strategies
- Nose ringing



# The relevant European context

## Council Directive 2008/120/EC

covers the 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 cause 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.

# Tooth clipping or tooth grinding

Removal of tips of sharp  
corner or "needle" teeth



# Tooth clipping or tooth grinding

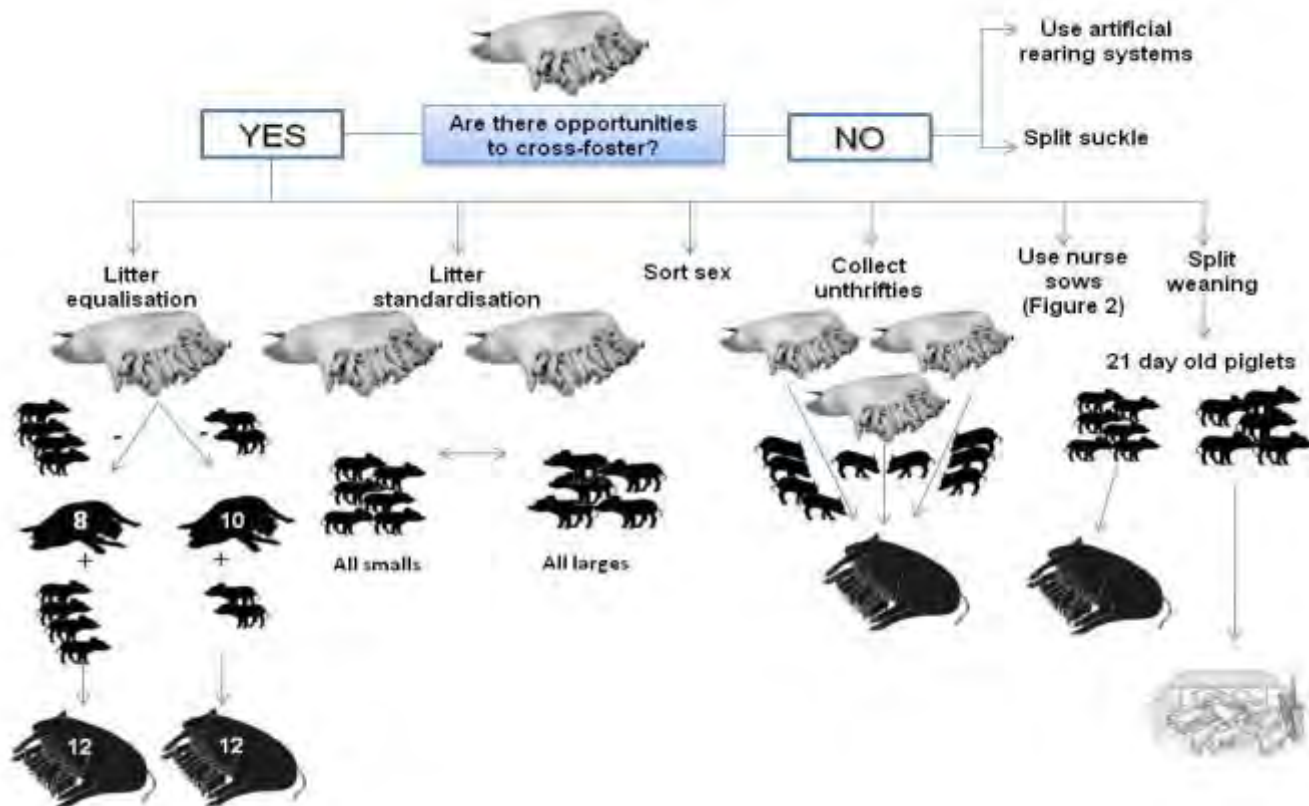
## INJURIES

Risk factor = large litter size





## Solution = optimal management of large litters



## Optimal management of large litters - Benefits



Creates stable  
teat order



Calmer sucklings

# Tooth clipping or tooth grinding

**Operator training =  
greatest risk to welfare**

**Tooth clipping**



Only remove tips

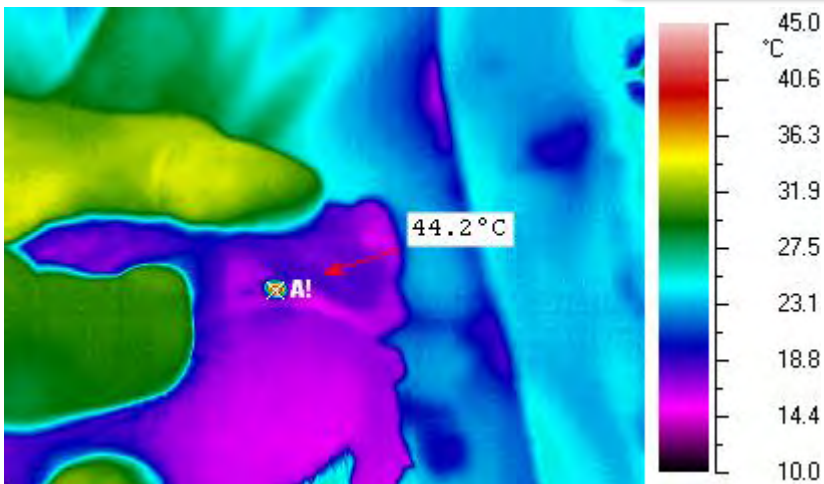


Clippers - sharp, clean

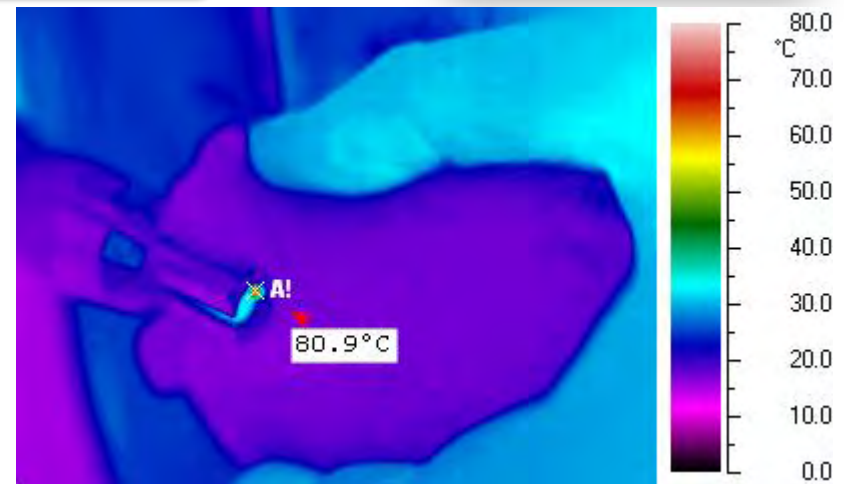
# Tooth clipping or tooth grinding

**Operator =  
greatest risk to welfare**

**Tooth grinding**



3 seconds



6 seconds

# Surgical castration



Source: S. Edwards

**Estimated 80% of male piglets  
(100 million pa) in the EU**

**Reduce aggression and  
sexual activity**

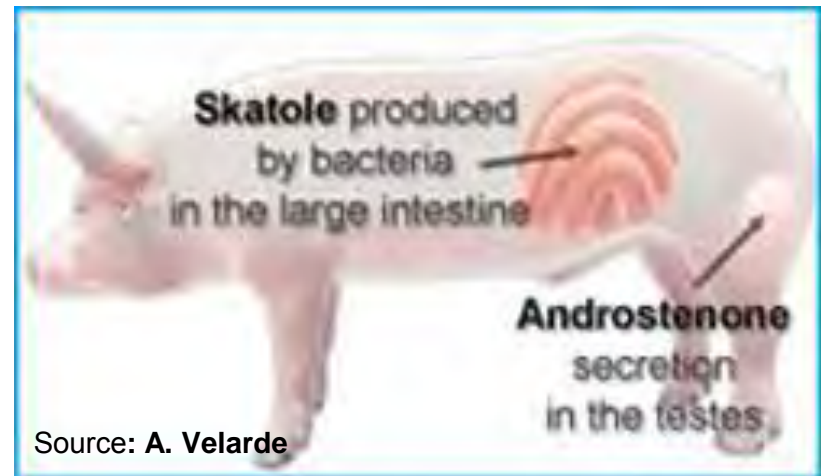
**Prevent “boar taint”**



# Boar taint

## Androstenone

- Male sex hormone
- Produced in Leydig cells in testes
- Accumulates in adipose tissue
- Secreted in urine and saliva



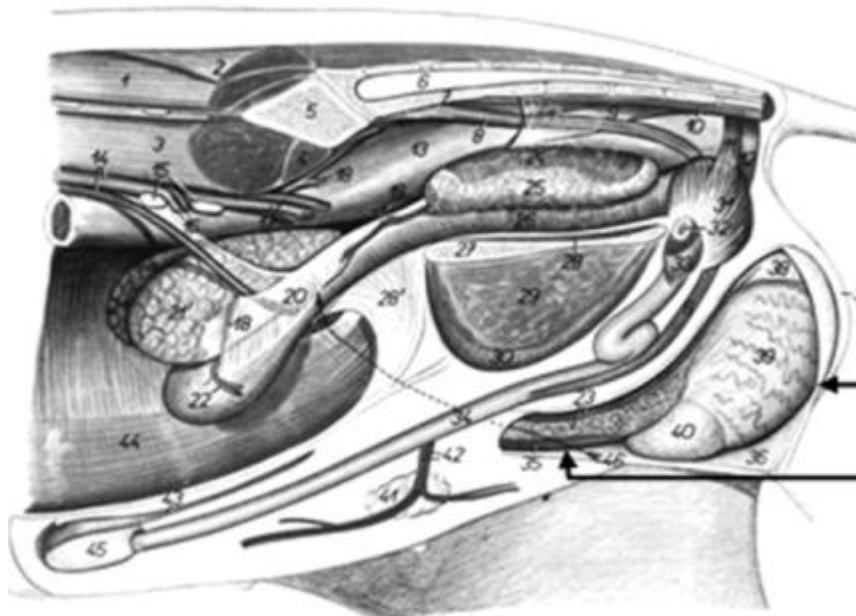
## Skatole

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

In the absence of a normally function testes, boar taint is virtually eliminated

Cause of high prevalence of castration

# Surgical castration



Adapted from Prunier et al  
2005

**Most common type of castration  
procedure performed in the EU  
(80% male pigs – EU27)**

## **1. Incision of the scrotum**

- 2 cm - as low as possible  
(better drainage of the wound)

## **2. Cutting of spermatic cord**

- **Tearing prohibited**

**Welfare Implications (EFSA 2004)**

**Induces physiological and behavioural reactions indicative of pain**

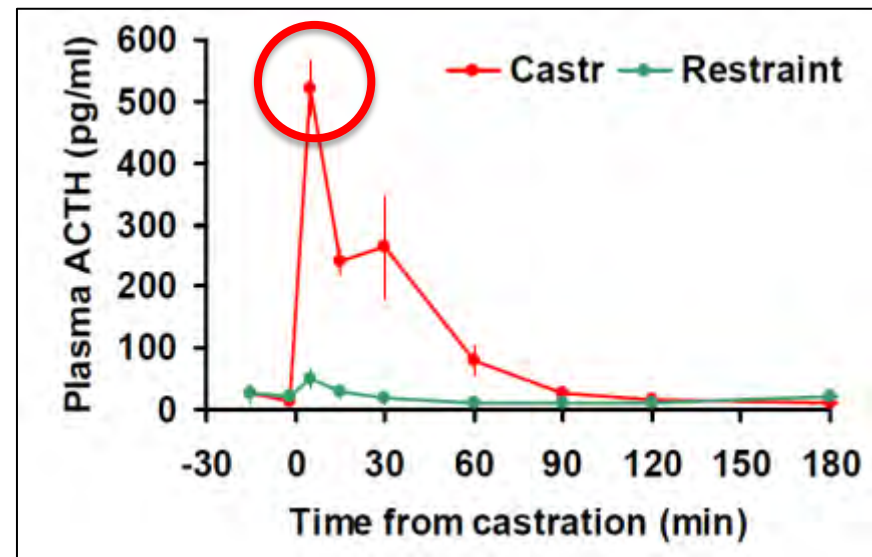
# Surgical castration

## Physiological indicators of pain

**Immediate activation of the sympathetic and adrenal axis**

**Significant elevation in heart rate**

**x40 increase in plasma ACTH  $\Rightarrow$  x3 increase plasma cortisol – 15 mins after castration**





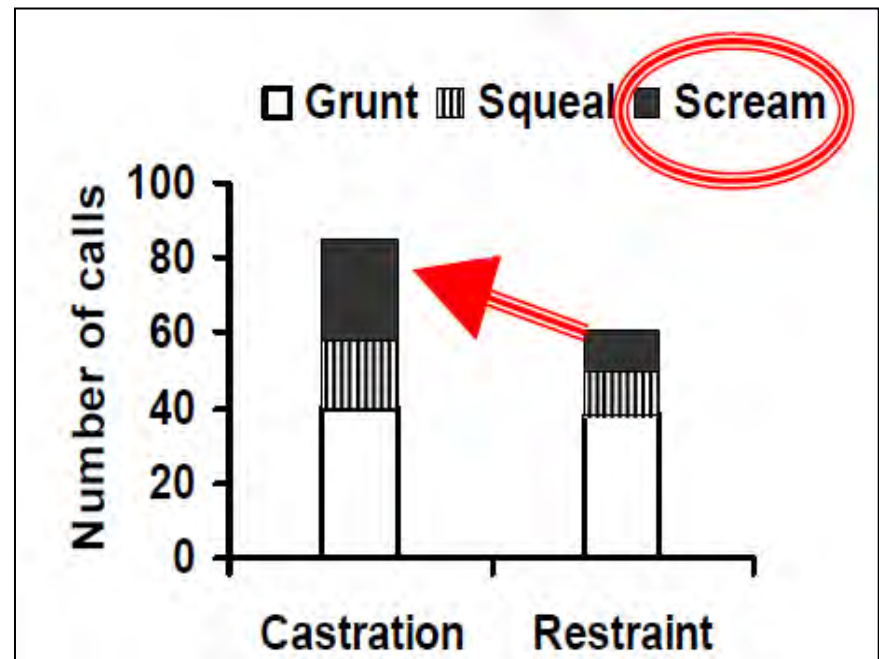
# Surgical castration

## Behavioural indicators of pain

### Immediate pain-related behaviours

**Increase high frequency vocalisations**

**Increased physical resistance to handling**



Adapted from Marx et al 2003

# After surgical castration

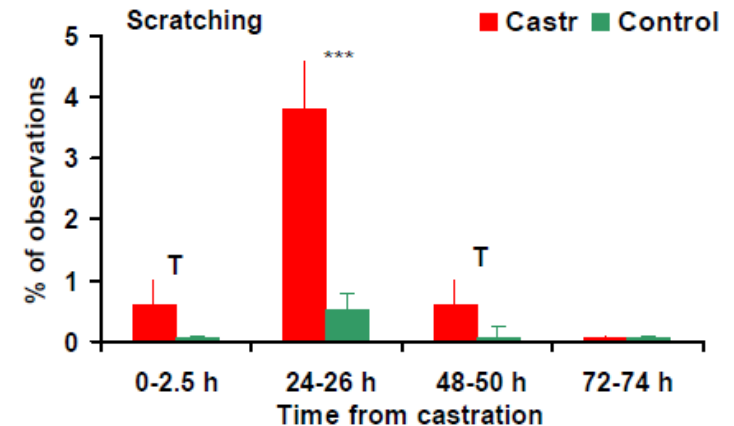
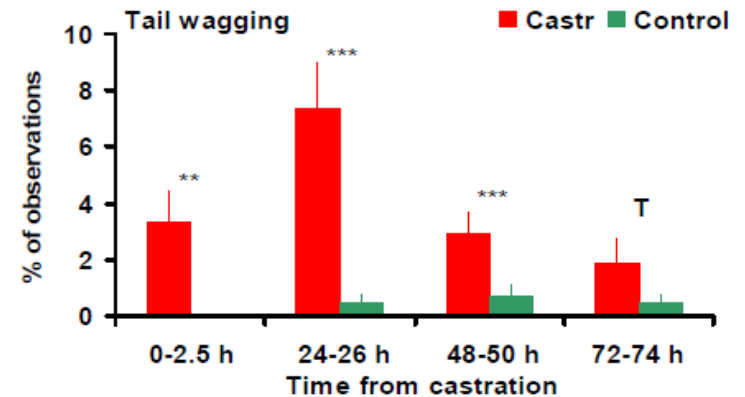
**Post surgical pain can last for 5 days**

## Behavioural signs

- Less activity and locomotion
- Trembling/spasms
- Huddling up
- Scratching/rubbing of the rump
- Avoidance of litter mates (isolation /desynchronised behaviours)

## Immunosuppressive effect?

- Stress reaction?



*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 EU by January 2018 (EFSA 2004)

**First step (from Jan 2012)** = Castration should be performed with prolonged analgesia and/or anaesthesia.

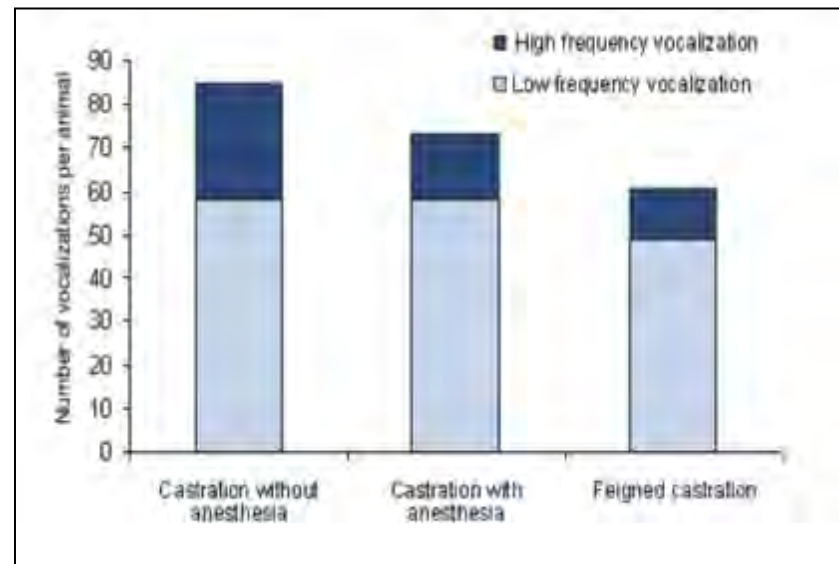
**To date - limited evidence of farmers adopting these approaches with surgical castration**

# Surgical castration (with anaesthesia/analgesia)

## Use of local anaesthesia

**Injection of lidocaine  
+adrenaline into testis and/or  
spermatic cord**

- 10 min diffusion time
- Reduced acute pain (e.g. high frequency vocalisations)
- Less stressful = reduced ACTH and cortisol post castration



# Surgical castration (with anaesthesia/analgesia)

## Use of general anesthesia

**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 post-castration pain
- Long periods of sedation can increase risk of piglet 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 UK and Ireland**

- Slaughter <100 kg (before sexual maturity)

## Advantages

- Greater alimentary efficiency
- Leaner carcasses
- Increased PUFA content
- Lower nitrogen excretion
- Reduced production costs

## Disadvantages

- Increased aggression/mounting
- More carcass damage
- DFD meat
- Increase risk of boar taint
- Lower profitability

# Production of entire males

## Management of boar taint (pre-slaughter)

### 1) Slaughter at lower weight

- Risk reduced but not completely removed

### 2) Housing

- Skatole from soiled floors absorbed through skin

### 3) Nutrition

- High energy feed increases risk

### 4) Genetics

- Both factors have medium to high heritability
- Genetic markers
- Delay sexual maturity





# Production of entire males

## Management of boar taint (post -slaughter)

### Sensor array based detection systems

- "electronic noses"
- still in development stages

### Laboratory based assays

- For androstenone and skatole
- ELISA/Spectrophotometry
- Time consuming, costly, inconsistent?

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

# Immunocastration

**Immunization of young males against gonadotrophin releasing factor (GnRF)**

- Vaccine (e.g. Improvac)

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

**Widely used in Australia since early 2000.**

**Optimised injection protocols can have significant welfare benefits over surgical castration**



Source: Ulla Schmidt

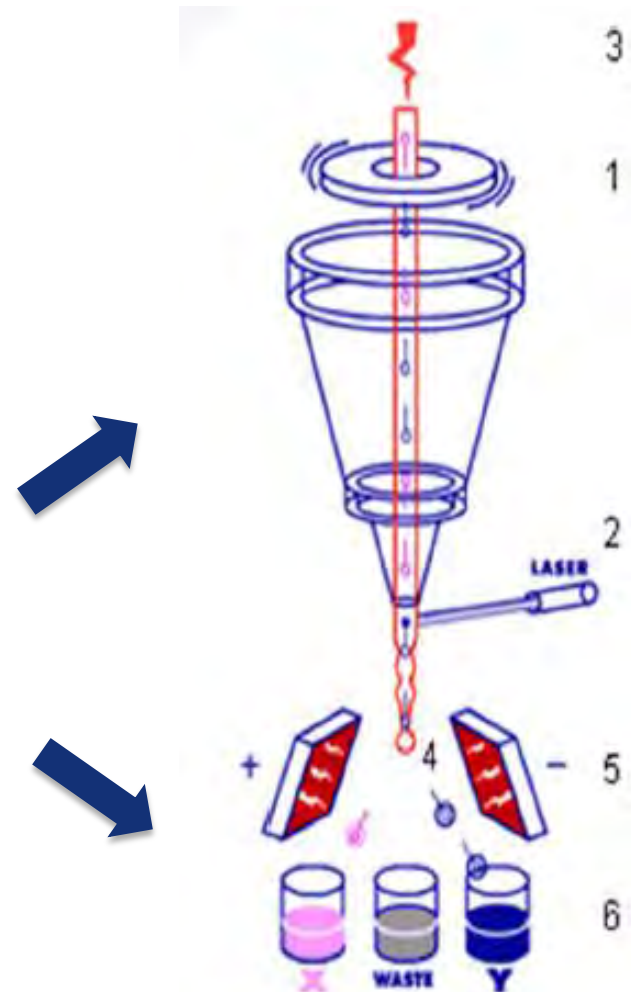
# Spermatic selection

**Sexing of spermatozoids to produce only females**

## Flow cytometry

- Detect and sort spermatozoids based on size of DNA of X and Y chromosomes

**This approach is not a yet commercially viable option for most farmers**



# Tail docking

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

**Directive states: 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



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

# Tail docking

## Welfare Implications

### Acute responses indicative of pain

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





# Tail docking

## Welfare Implications

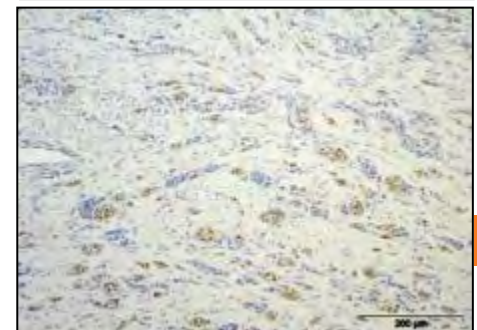
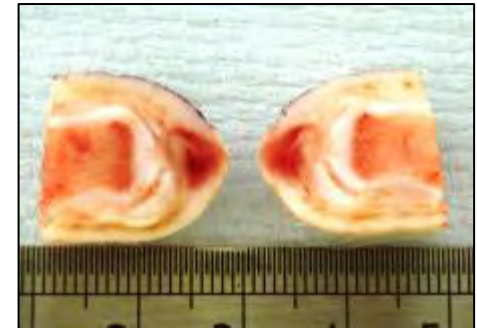
**Possible long-term pain?**  
**Abnormal sensations or pain caused by  
traumatic neuroma formation in the tail stump**

### EU FareWellDock project (2014-2017)

- Traumatic neuroma characterisation
- Functional nerve studies
- Mechanical nociceptive thresholds
- Peripheral/spinal neuronal changes in gene expression of pain mediating neuropeptides



[www.farewelldock.eu](http://www.farewelldock.eu)



# 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 the ability to perform foraging behaviour

**Can lead to redirected exploratory behaviour that leads to tail biting**

**Aetiology of tail biting is highly complex and multifactorial**



Source: PROVIEH

# 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



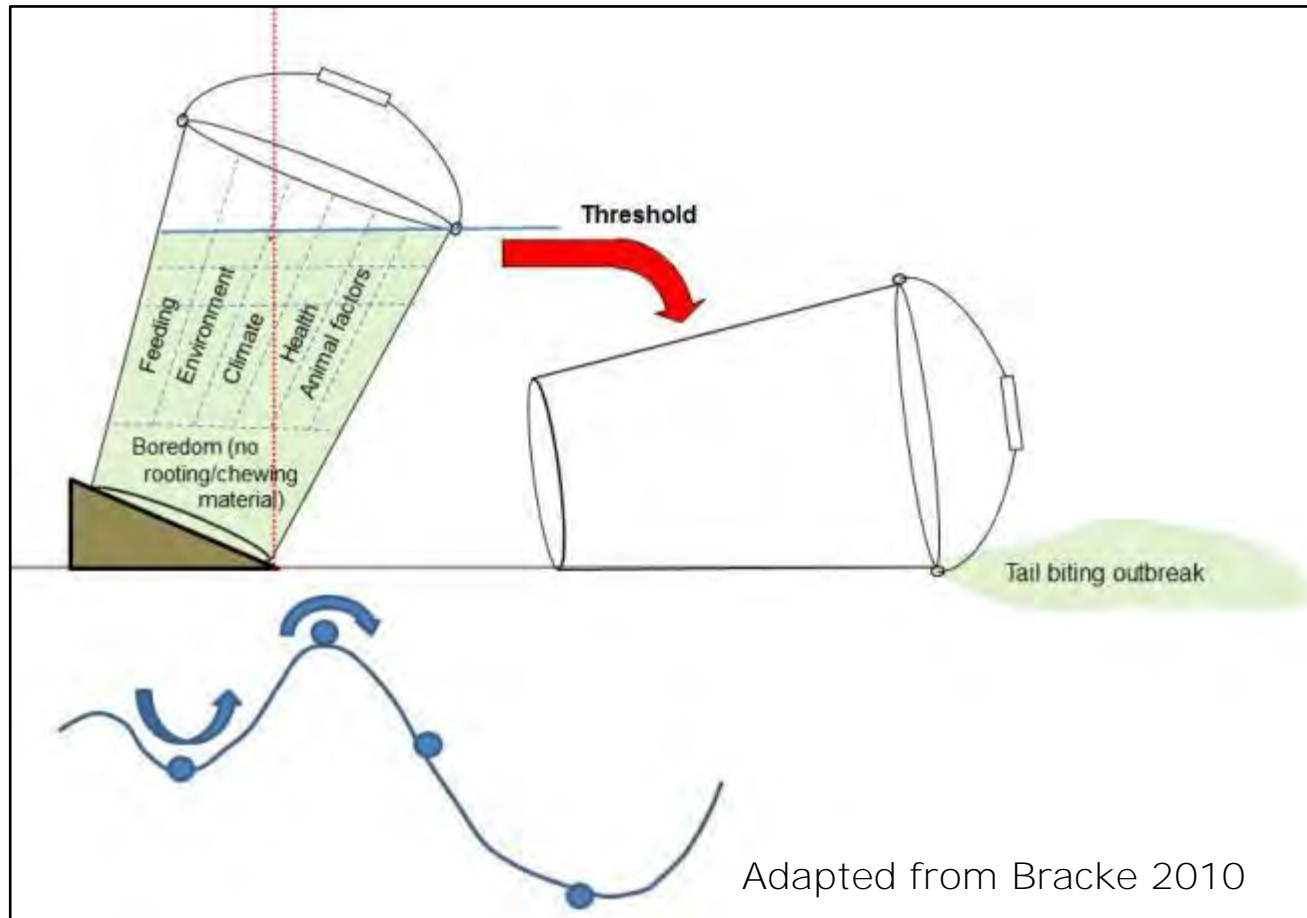
- Dietary deficiency of essential amino acids
- Imitation
- Inadequate ventilation



**SERIOUS TAIL BITING**



# Tipping bucket model of 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, peat

**Damaging tail biting greatly reduced when pigs were given:**

- 10 g twice a day per pig - straw (Zonderland et al., 2008)
- 12.5 g a day per pig - chopped straw and wood shavings (Munsterhjelm et al., 2009)

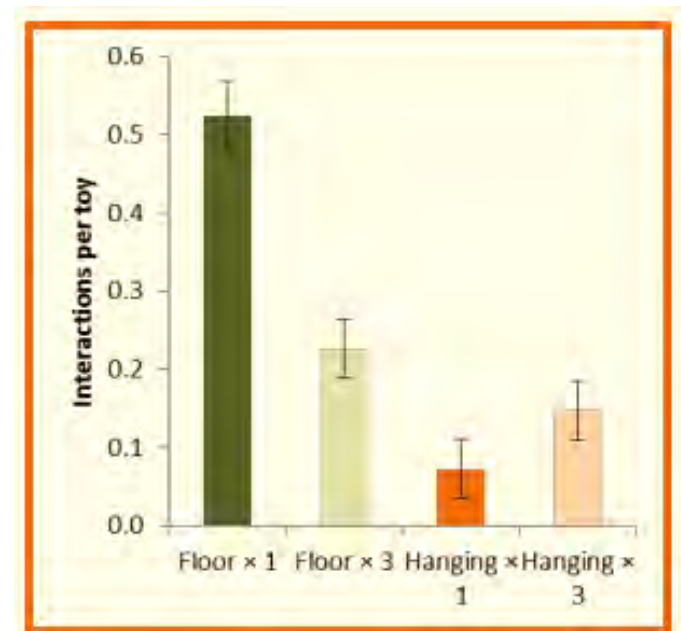


# Environment enrichment

## Fully slatted systems



[www.farewelldock.eu](http://www.farewelldock.eu)



O'Driscoll et al 2014



## Before carrying out tail docking

- Review the composition of the feed
- Review environmental conditions and housing conditions
- Separate out animals with existing tail wounds

## What to do if an outbreak occurs

- Try and identify the biter and remove
  - Biter characteristics - often small, runty pigs, hyper-reactive
- Put in enrichment
- Check risk factors

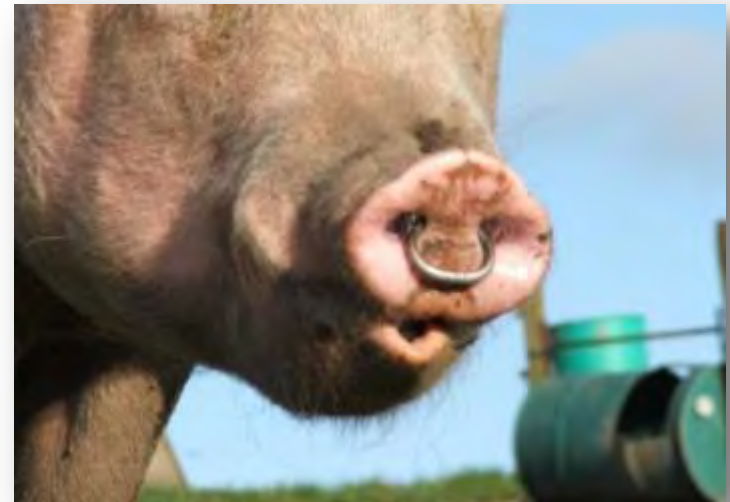
# Nose ringing (outdoor pigs)

## Purpose?

- Protect the land
- Protect sow/boar legs when rooting
- Protect farmer/restraint

## Solutions?

- Increase above ground forage options
- Provision of sacrificial land for foraging and rooting



Cannot stop a natural behaviour completely

**Little research into welfare consequences of nose ringing in pigs**



# Thank you for your attention

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