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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Content

Directive 2008/120/EC

Painful operations in animals

• Tooth resection
• Castration
  - New strategies
• Tail Docking
  - New strategies
• Nose ringing
The relevant European context


**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.
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)
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.

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

Baxter et al. 2013 Animal Welfare 22
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

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

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

Source: S. Edwards
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

Source: A. Velarde
Surgical castration

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

Adapted from Prunier et al 2005
Surgical castration

Physiological indicators of pain

Immediate activation of the sympathetic and adrenal axis

Significant elevation in heart rate

x40 increase in plasma ACTH ⇒ x3 increase plasma cortisol – 15 mins after castration

Adapted from Prunier et al 2005
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-tem 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 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
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

SERIOUS TAIL BITING

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

- Redirected exploratory behaviour

- Absence of straw or similar substrate
Tipping bucket model of tail biting

Adapted from Bracke 2010
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

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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