A Welfare Issue: Docking in Pigs

Introduction

Porcine tail docking is a well-researched procedure. There are studies that focus upon the best methods of tail removal, how much tail should be removed and at what age, the acute pain and stress indicators, and its effects as a preventative method against tail biting. As docking is a voluntary removal of flesh, it must be analysed alongside standardised welfare practices. The procedure must be justified as contributing to, or not diminishing, the welfare of the pig. Whilst porcine docking was the standard practice worldwide some 20 years ago, the EU and much of Australia now prohibits it routinely being used. However, within the USA there is no national laws which prohibits any aspects of docking. There are contentions around whether docking is an effective measure against tail biting.

Docking & Animal Welfare within Australia

Within Australia, the National Animal Welfare guide must always be followed, but individual states and territories are allowed to create further legislation to protect and maintain welfare. The Model Code of Practice states the basic needs of a pig owned within Australia.

> *Readily accessible, appropriate, and sufficient food and water; Adequate shelter to protect from climatic extremes; Opportunity to display appropriate patterns of behaviour; Physical handling in a manner which minimised the likelihood of unreasonable unnecessary pain or distress; Protection from and/or rapid diagnosis and correct treatment of injury or disease; Freedom for necessary movement including to stand, stretch and lie down; Visual and social contact with other pigs.* (CSIRO, 2008)

Welfare guides are still guided by the five freedoms of welfare created in 1979. These freedoms are the freedom from; thirst, hunger and malnutrition, thermal and physical discomfort, pain and injury and disease, fear and distress, and the freedom to express normal behaviour (Mellor, 2016).

Specific docking legislation is varied between states and territories. While Victoria follows the National guide without additional amendments, Queensland has additional legislation which states that all porcine docking is prohibited. The National guide states that;

> *5.6.8 tail docking should be avoided wherever possible*
>
> *5.6.9 Where tail biting is a problem, all aspects of the environment, feeding and management should be investigated to identify the contributing factors so that remedial action can be taken, e.g. environmental enrichment with straw or other materials that can be manipulated.*

> *5.6.10 where tail docking is practised as a preventative measure, it should be carried out before pigs are seven days of age.* (CSIRO, 2008)

What is Docking?

Docking is the removal of the end of an animal's tail. Agricultural farming animals such as cows, sheep and pigs undergo docking for different reasons. Cows, to help with issues of hygiene and mastitis. Sheep, to prevent fleece rot from flies, and pigs to reduce tail biting. Docking is also used on certain domesticated dog breeds. Whilst, the docking historically was used for hunting or fighting dogs to prevent injuries, it is now predominantly done for specific working breed, or aesthetic purposes. As with porcine docking, many countries now have restrictions or complete bans on dog docking.

Docking is performed through one of three methods. The tail may be surgically cut off, severed with a cautery iron, or removed via a constrictive rubber ring. (Kritas and Morrison, 2007). Anaesthetic or analgesic is required if the docking is performed after seven days, which is allowed within the EU and USA, before six days no pain relief is required. The length of tail being docked is dependent on individual farms with ¼, ½, or ¾ of the tail being removed. ¼ length removed simply removes the tufted hair at the tip of the tail, whilst the other lengths remove larger proportions of the tail. The removal of the tail is primarily to prevent or minimise tail biting, through the reduction of a biteable area, and an increased sensitivity of the tail tip. (Moinard, 2003; Noonan et al, 1994).

The Big Issue. Tail-Biting

Tail biting, somewhat self-explanatory, is the biting of one or more pigs of another individual's tail. Tail biting occurs in two phases, chewing and then followed by biting. 'Low Intensitiy' chewing or mouthing is first repetitively done by one or more pigs in a pen. Once the area has drawn blood, it will then attract biting behaviour in the pig who induced blood and in other pigs in the pen. The biting can leave open wounds, in which bacteria can enter, which can lead to infections. Infected areas can have trouble healing as the other pigs are more likely to continue biting the area once it has first been bit. This can lead to repetitive issues of abscesses and can escalate to the pigs cannibalistically eating the tail. Tail biting habits are often also linked to ear biting. Ear biting however is less frequent, possibly since it is more likely to provoke an attack. (Beattie et al, 2007; Noonan et al, 1994, Van Putten, 1969)

Tail biting can affect the health of both the wounded pig and the instigator. As well as being an indicator of general welfare within the pen. The injured pigs may have a persistent reduced weight gain, external or internal abscesses and subsequent sepsis, or pneumonia. When slaughtered injuries and infections are noted

by the abattoir, which in turn effects the quality score the pig and potentially the farm receives. Cases with serious health issues will also be condemned. (Heinonen et al, 2010; Kritas and Morrison, 2007; Moinard et al, 2003; Noonan et al, 1994; Zhou et al, 2013) The study by Heinonen et al, 2010, showed that 42% of abattoir condemnations due to abscesses, were found within tail bitten pigs. (Heinonen et al, 2010).

Kritas & Morrison, 2007, looked at 7000 pigs that passed through an abattoir. The 2 studies compared the injuries found within pigs that sustained tail biting, and pigs with uninjured tails. The severity of tail biting, pneumonia, abscesses, and pleuritis were compared. The first study showed an, "association between the severity of tail biting and the prevalence of lungs with abscesses and/or pleuritic lesions." While the second study showed a correlation between bitten tails and external abscesses, and a higher frequency of bitten tails within castrated males. (Kritas and Morrison, 2007).

Why Does Tail Biting Happen?

Tail biting is a sporadic phenomenon, that is not exhibited in the behaviour of wild pigs. As such, many different studies have tried to link tail biting behaviour to either predisposing tendencies or external circumstances (Beattie et al, 2007; Kritas and Morrison, 2007; Moinard et al, 2003; Zhou et al, 2013). There are numerous factors that are thought to affect the presence and severity of tail biting. These include;

> *Diet, flooring type, presence or absence of enrichment material, limited feeder space, method of feed delivery, stocking density, genotype, gender, health, gastrointestinal discomfort, numerous stressors, climate, group size, and tail docking.* (Zhou et al, 2013)

A study by Beattie et al, 2007, looked at weaned 4-week-old pigs and their tail biting habits, using mock rope tails. The study showed that time chewing on the mock tails correlated with pigs that had shown a slower growth rate during the lactation period. The conclusion of the experiment suggested that biting behaviour could be linked to a nutritional deficiency. (Beattie et al, 2007; Fraser, 1987a; Fraser, 1987b; Fraser et al, 1991). Beattie et al, also recognised that the chew test did not prove a correlation with a, "predisposition to show harmful social behaviour" (Beattie et al, 2007). This study provided corroborating evidence to cases which posed salt deficiency as a factor linked to tail biting. (Beattie et al, 2007; Fraser, 1987a; Fraser, 1987b; Fraser et al, 1991)

Breuer et al, 2005, tried to identify a genetic marker or predisposition within two pig breeds. A total of nine thousand and eighteen Purebred Large White pigs and Landrace pigs (a mixed domestic pig) were genetically tested. Using, "pedigree and performance data to calculate the heritability", the Landrace pigs were shown as having a heritability of tail biting. This heritability was also linked with genetic markers for leanness and back fat thickness. It was then posed that the genetic markers linked with tail biting behaviour are likely to have been selected in with past production trait selecting. This heritability suggest that tail

biting behaviour could be reduced through selectively breeding out the gene. The difficulty in this lies within not losing the preferable traits also. Three hundred and three tail biters were identified during this study, which was only 3.3% of the total pigs. While, this sample size is substantial by itself, it is a poor reflection of the larger population (Breuer et al, 2005).

Epidemics of tail biting is also repeatedly linked to poor living conditions. Moinard et al, 2003, reports environmental factors as a risk indicator for biting. Table 1 shows how the risk factors influenced tail biting. The study showed that using slatted floors for grower pigs, lack of space in feed areas, and stocking density of 110kg/m² or more increased the risk of biting. Farms with bedding or a manipulative substrate report lower numbers of tail biting. Adding straw in creep area daily, decreased risk 10-fold. (Moinard et al, 2003). The substrate allows the pigs to use natural foraging behaviour. This proposes that tail biting occurs as a foraging behaviour substitute. (Beattie et al, 2007; Breuer et al, 2005; Kritas and Morrison, 2007; Moinard et al, 2003; Zhou et al, 2013; Van Putten, 1969). Large numbers of tail biting also correlated to farms with, “poor ventilation, nutrient deficiencies, and pigs with poor health” (Zhou et al, 2013).

Table 1: Risk factors increased or decreasing the occurrence of tail biting (TB) as identified in the literature (Moinard et al, 2003)

Risk factor	1	2	3[a]	4	5	6	7[b]	8	9	10	11[a]	12	13	14[a]	15
Males are tail bitten more than females		✓	✓						✓						
Additional straw reduces TB				✓	✓	✓	✓	✓		✓	✓	✓			✓
Liquid feed increases TB											✓				
Ad libitum feeding reduces TB		✓													
Access to earth and peat reduces TB	✓							✓		✓			✓		✓
High stocking density increases TB		✓					✓						✓		✓
High ambient temperature increases TB		✓													
Low protein intake increases TB		✓					✓								
Large group increases TB		✓					✓								
High level of ammonia increases TB							✓								
Automatic feeding increases TB											✓				
Poor ventilation increases TB	✓										✓				
Climatic extreme (winter and summer) increases TB							✓								
Some breed may tail bite more							✓								
Single space feeder with stall reduces TB														✓	

(1) Van Putten (1969); (2) Jericho and Church (1972); (3) Penny and Hill (1974); (4) Van Putten and Dammers (1976); (5) Van Putten (1980); (6) McKinnon et al. (1989); (7) Arey (1991); (8) Fraser et al. (1991); (9) Morrow and Walker (1994); (10) Beattie et al. (1995); (11) Chambers et al. (1995); (12) Petersen et al. (1995); (13) Beattie et al. (1996); (14) Hunter et al. (1999); (15) Beattie et al. (2000b).

[a] Epidemiological studies.

[b] Review article.

Acute Behaviour & Pain Once Docked

The immediate and short-term behaviour of pig docking is well researched. The acute pain and stress behaviour immediately following the procedure is temporary. The stress related behaviour is often primarily attributed to the pig being restrained rather than the tail removal (Noonan et al, 1994; Sutherland et al, 2008). The physical indicators of pain or distress include; “reduced eating, restlessness, foot stamping, head turning, total active behaviour, time spent in abnormal postures, vocalisation, tail wagging and tail jamming.” The Physiological indicators include changed; heart rate, cortisol levels, haemoglobin levels and cell counts (Sutherland et al, 2008).

Noonan et al, 1994, compared the immediate behaviour of pigs that were constrained, vs constrained and undergoing a procedure (docking, ear notching, teeth clipping). The results showed that there was distress from the pigs being merely constrained, but more so when docking also occurred. In docking procedures, the

pig showed tail jamming and wagging, alongside grunting within the first sixty seconds following the procedure (Noonan et al, 1994)

Zhou et al, 2013, observed docked pigs spending more time alone rather than with littermates for up to fifteen days. This is an indicator of a more continued distress. Young pigs have poor thermoregulation and use huddling to keep warm (Zhou et al, 2013).

Distress associated behaviour has also been compared within the different docking techniques. Sutherland et al, 2008 compared stress responses in cautery vs surgical cutting docking. The study showed cautery docking had a reduced cortisol response and showed lower levels of distress, when compared to surgical docking. This was linked to the cauterizing burning nerve nociceptors (Sutherland et al, 2008).

Long Term Behaviour & Pain Once Docked

The long-term effects of tail docking is a less research field. Studies about residual pain and sensitivity within the tail is often derived from research with dog and sheep docked tails. The docked tails of dogs show a higher level of sensitivity to both physical and temperature base stimuli, than the undocked tail. Increased sensitivity is often caused by the formation of neuromas, or nerve cells within the remaining stump (Di Giminiani et al, 2017; Herskin et al, 2015; Moinard et al, 2003; Noonan et al, 1994). Herskin & Jensen, 2015, further indicated an increase of neuroanatomical consequences, such as neuromas, within cautery docking (Herskin et al, 2015). Additional studies link docking to the amount of back fat present. With results showing increased back fat in docked pigs, while others show no correlation (Zhou et al, 2013).

Whilst there are reports showing evidence of tail docking decreasing the frequency of tail biting, there are also those which report no difference in frequency. Beattie et al, reported an additional link between decreased tail biting in docked pigs. With an increase in ear biting appearing with docking. Whilst this indicated a remaining issue of biting. Ear biting has less long-term related health issues, as the bitten pig is less likely to allow severe or continual biting (Beattie et al, 2007).

Zhou et al, 2013, studied bitting within docked and un-docked pigs when they were 70, 120 and 160 days old. These would be considered grower-finisher pigs, in which tail biting behaviour would be evident. The study did not show a significant difference in biting frequency between docked and un-docked pigs in any of the observed ages. Table 2 shows the types and severity of the wounds present. It was concluded that docking had no, “detrimental effects on mortality,

Table 2: Frequency of body and tail wounds assessed at 70, 110, and 160 days of age (Zhou et al, 2013)

	Wound score[2]						
	0		1		2		
Item	Processed	Sham	Processed	Sham	Processed	Sham	*P*-value
Body Wounds							
d 70	44	51	13	7	0	0	0.13
d 110	22	25	34	26	1	7	0.06
d 160	47	52	10	6	0	0	0.27
Tail Wounds							
d 70	48	48	9	10	0	0	0.84
d 110	26	26	31	30	0	2	0.37
d 160	50	52	7	6	0	0	0.74

[1]Data of wounds were analyzed using the χ^2test.

[2]Individual level of wounds on the body and tail were assessed according to this standardization: If no lesion or wound was present, the cumulative wound score was 0; 1 to 4 observed lesions received a cumulative wound score of 1; more than 4 observed lesions received a cumulative wound score of 2.

morbidity, live performance, or carcass merit of growing-finishing pigs" (Zhou et al, 2013).

Welfare of Docking

Welfare, as discussed above, is the basic needs of an animal being met. Docking challenges these welfare needs. The docking procedure can cause short-term pain and discomfort, distress from restraining the pig, neuromas, and increased ear biting. This challenges two of the five freedoms of welfare, freedom from pain and freedom from distress. (CSIRO, 2008; Mellor, 2016)

Tail biting, also, challenges pig welfare needs. Tail biting can cause injury, further biting behaviour, infection, abscesses, sepsis, pneumonia, and cannibalism. This challenges three of the five freedoms of welfare; freedom from pain, freedom from distress, and freedom to express normal behaviour (CSIRO, 2008; Mellor, 2016).

Conclusion

Porcine tail docking, or the practice of removing part of a pig tail, is primarily used as a preventative measure to reduce tail biting incidents. Studies have been conducted as to determine the least harmful way to conduct docking, short and long-term effects of docking, reasons why tail biting occurs, and the effectiveness of docking to reduce tail biting incidents. As studies show many different results in the effectiveness of docking, the best welfare practice depends on a case-by-case basis. Much evidence shows that sufficient space to move and movable substrate diminishes tail biting, as such this issue should be addressed before tail docking is considered. However, in environments in which space and substrate is not changeable, it is perhaps in the pigs best welfare to use docking as a preventative method.

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