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*Welfare Implications of  
Practices Performed on Piglets*

(March 26, 2010)

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**PIGLET TEETH CLIPPING, TAIL DOCKING, CASTRATION AND PERMANENT IDENTIFICATION**

**INTRODUCTORY STATEMENT**

Piglets may undergo a battery of procedures during the first few days or weeks of life, potentially including tooth-clipping, tail docking, castration, and ear-notching or another identification method such as tagging or tattooing.<sup>1</sup> Each of these procedures involves a degree of tissue damage potentially resulting in the piglet experiencing pain. As it is generally accepted that pigs experience pain, and pain compromises welfare, it would be desirable for these procedures to be refined or replaced with practical alternatives, so long as this results in a net benefit to the animal. The corresponding background information is grouped together because strategies such as reduced invasiveness, analgesia and anesthesia, and replacement are common themes requiring consideration for each procedure. While some procedures (such as identification techniques) have received relatively little research attention, general findings, such as which analgesics are safe and effective for use with unweaned piglets, may be broadly applicable.

**PIGLET TEETH CLIPPING**

**THE PRACTICE**

Piglets are born with outwardly projecting canine or “needle” teeth used in competition with littermates for teat access. These teeth can be blunted or shortened during the first week of life by grinding the tip, clipping the tip, or clipping the tooth at the gum line.

**BENEFITS**

Litters of piglets with intact needle teeth suffer more facial lacerations,<sup>2,3,4,5,6,7,8</sup> and their sows may have more lacerations on their udder<sup>4,8</sup> and may shield their teats by spending more time lying on their bellies.<sup>4</sup> Piglets whose teeth have not been clipped may sometimes suffer higher rates of mortality due to increased overlying and crushing by the sow;<sup>8</sup> it has been suggested this might be due to sows being injured and becoming more restless.<sup>4</sup> However increased udder injury is not always found when piglets are left intact,<sup>8</sup> and it has also been suggested that piglets whose teeth have not been clipped are less competitive and so lie closer to the sow thus increasing their risk of being crushed.<sup>8</sup>

**DETRIMENTS**

Clipping has been shown to increase behaviors suggestive of discomfort such as “chomping.”<sup>5</sup> Piglets whose teeth have been clipped may experience more gum and tongue injuries<sup>4,8</sup> and potentially painful inflammation or abscesses of the teeth.<sup>9,10</sup> These injuries may lead to infections and increased time spent sleeping (seen as an indicator for infection).

## REFINEMENTS

**Reduced Severity**—Clipping off the tip of the tooth has similar benefits to clipping to the gum line.<sup>11</sup>

**Technique**—Some studies find that grinding causes more damage and distress<sup>12</sup> than clipping, while others found clipping to be more damaging. Equipment maintenance and staff proficiency may be more important than the type of equipment used.

## ALTERNATIVES

Clipping is now often carried out selectively on individuals or litters demonstrating or predisposed to injuries. Clipping only as required can save time and labor costs, but involves clipping some teeth at a later age.<sup>1,15</sup> Routine clipping may be easier to forego when working with more placid breeds<sup>13</sup> and when larger litter sizes are avoided.<sup>13,14</sup>

## SUMMARY

Clipping, properly performed, rarely produces significant changes in growth rate,<sup>4,7</sup> weaning weight<sup>8,7</sup> or mortality.<sup>4,7</sup> It is performed primarily to reduce animal discomfort and poor appearance due to lesions; however, tooth resection also causes discomfort and potential infection due to opening of the pulp cavity. Routine preventive teeth clipping is reportedly becoming less common.<sup>1,15</sup>

## PIGLET TAIL DOCKING

### THE PRACTICE

Tail biting causes physical damage and fear in recipient animals. Tail-bitten pigs are also more likely to exhibit pleuritis (inflammation) and lung abscesses<sup>16</sup> and their carcasses are more likely to require trimming. Tail injury may<sup>17,18</sup> or may not effect growth or mortality depending upon severity.

Tail docking reduces the incidence and severity of tail injury. The incidence of preventive tail docking is hard to establish. A survey of supermarkets conducted in the UK in 2007 provided an estimate that 88% of pigs were tail docked—although tail docking is permitted in the UK only when tail biting is a problem and not as a routine precaution.<sup>19</sup>

### BENEFITS

Tail-docked pigs have been found to have fewer tail injuries<sup>20,21</sup> and indications of better immune function.

### DETRIMENTS

Tail docking causes physiological and behavioral responses indicating acute stress when performed on six-day-old pigs.<sup>22</sup> These include increased blood cortisol concentrations, reduced white blood cell count and increased sitting and scooting behavior. The cortisol response does not occur when tail docking is performed with a cauterizing iron.<sup>22,23</sup> Docked tails may develop neuromas, which are associated with increased sensitivity to pain.<sup>24</sup>

### CONSIDERATIONS: CAUSAL FACTORS

Outbreaks of tail-biting behavior are complex, with many contributing factors. There is an inherited component in some breeds associated with lean carcass traits.<sup>25</sup> Pigs are more likely to be bitten if they have an undocked tail,<sup>26</sup> hold their tail between their legs,<sup>27</sup> or are male.<sup>16,28</sup> Males may be more frequently bitten when housed with females,<sup>29</sup> but other studies suggest that mixed-sex housing reduces the incidence of biting overall.

Although tail biting does occur in outdoor systems, it is generally less common in outdoor housing or indoor housing with natural ventilation. Provision of solid floors and straw<sup>26,30,32</sup> reduces the incidence of tail biting.

Schmolke et al did not find that group size (10 to 80 pigs) affected rates of tail biting.<sup>31</sup> However, in general terms, tail biting is more likely to occur with high stocking densities and increased numbers of pigs per feeding space.<sup>26,32</sup>

Once tail biting has begun to occur it may continue and intensify due to attraction of pigs to the smell and taste of blood.<sup>33,34</sup>

## REFINEMENTS

Tail docking with a hot iron was found to cause more distress and neuroma formation and so it is not an effective refinement of technique.

## SUMMARY

Tail docking is performed to prevent peer-inflicted injury to the tail that can become severe. Because docking causes pain and stress, it should be performed as early as possible and/or in conjunction with appropriate analgesia. The ideal welfare outcome would be for tail biting to be reduced to a level where tail docking need not be carried out routinely, if at all. Although tail biting has a complex etiologic basis some researchers believe that improved environmental design is the most promising approach to reduce biting and reduce or eliminate the need for docking.<sup>35</sup>

## PIGLET CASTRATION

### THE PRACTICE

Castration of piglets raised for meat is carried out prior to weaning by cutting the skin of the scrotum, severing the seminal ducts and removing the testes. The surgery is typically performed without anesthesia or analgesia.<sup>36,37</sup>

### BENEFITS

**Avoiding boar taint**—The flesh of intact boars contains variable amounts of compounds such as skatole and androstenone which can give their meat an unpleasant smell and taste. About 75% of consumers find the meat of boars objectionable in comparison with castrated males (barrows).<sup>38</sup> The prevalence and intensity of this preference varies on the basis of human genotype.<sup>39</sup> Barrows can be raised beyond puberty without developing a high level of boar taint, however they have poorer feed conversion and more fat deposits than boars.

**Increased docility**—Barrows exhibit less sexual and aggressive behavior making them easier to handle and less likely to injure or intimidate each other in group pens.

### DETRIMENTS

**Pain**—Castration involves cutting and manipulating innervated tissues<sup>40,41</sup> and if anesthesia is not provided it will be painful<sup>36,40,42</sup> as reflected by elevated blood cortisol concentrations<sup>40,43</sup> high-pitched squealing<sup>44,45</sup> and pain-indicative behaviors, such as trembling and lying alone.<sup>46,47</sup> Some behavioral indicators of pain may persist for up to five days.

**Long Term Risks**—It has been suggested that barrows suffer from suppressed immunity<sup>11</sup> and exhibit higher incidences of inflammation, and pneumonia and other diseases.<sup>48</sup>

## CONSIDERATIONS

**General anesthesia**—Anesthesia can be produced by inhalation agents. CO<sub>2</sub><sup>49</sup> is effective but causes distress in piglets.<sup>50,51</sup> Halothane and isoflurane<sup>52,53,54</sup> are also effective and do not seem to cause distress. On-farm use of anesthesia is rare due to a range of economic, logistical and safety issues, both for the pig and the herds person. The use of injectable general anesthetics is not recommended because of high mortality rates,<sup>55</sup> and long recovery periods and risk of crushing by the sow.<sup>56</sup>

**Local anesthesia**—The most commonly used local anesthetic is lidocaine<sup>57,58</sup> which has been shown to reduce responses as measured by EEG that are indicative<sup>59</sup> of nociception and behavioral pain responses.<sup>60,61</sup> Local anesthesia during castration is mandatory in Norway<sup>62</sup> although its overall efficacy is questioned by some farmers due to extra handling, injection and the associated later age of castration.<sup>63</sup>

**Long term analgesia**—Lidocaine in combination with meloxicam may provide the most comprehensive pain relief for castrated piglets. *Flunixin*, has also been used<sup>64</sup>; however, its effectiveness is unknown and may be poor., Aspirin and butorphanol appear to be ineffective.<sup>65</sup>

FDA approval of pharmaceuticals is required to allow their routine use. Procedures such as removal of piglets from the sow and injections still cause some marked discomfort and might be further refined,<sup>66</sup> for example it has been suggested that analgesic could be delivered to the pigs through the sow's milk.<sup>67</sup>

## REFINEMENTS

As both inhalant and injectable anesthesia can be stressful for piglets, a nasal spray or freezing procedure may be desirable alternatives if they can be made reliably effective.<sup>68</sup>

## ALTERNATIVES

Surgical castration has not been performed for many years in some countries including the United Kingdom, Ireland and Australia. The cessation of castration was motivated by the desire for leaner carcasses. In most cases the immediate method for minimizing boar taint was slaughter of pigs before puberty. In Australia and New Zealand immunocastration has also begun to be used.

**Immunocastration**—Immunizing pigs against gonadotropin-releasing hormone inhibits testicle development and has an overall effect similar to surgical castration. Immunocastration may face consumer resistance relating to the use of biotechnology or “hormones,” however a survey of Swedish consumers showed it was viewed positively and preferred over surgical castration or no castration.<sup>69</sup> Approved vaccines are not currently available in the United States.

**Selection**—Boar taint has a genetic component and so may be reduced through breeding.<sup>70</sup>

**Sperm selection**—Although the current technology is not efficient enough for commercial use it might be developed to allow the production of only female piglets.<sup>71</sup>

## SUMMARY

Castration is a painful procedure and animal welfare would be improved if it was performed under anesthesia and with analgesia, or replaced by a less invasive procedure. No large-scale refinements or alternatives are available for immediate implementation within the United States. However, several options are under experimental or commercial development and would benefit from increased funding and advocacy.<sup>72</sup>

## PIGLET IDENTIFICATION METHODS

Pigs need to be individually identified throughout life for management and traceability of products for safety or assurance schemes.<sup>73,74</sup>

## EAR NOTCHING

Ear notching is considered to be painful.<sup>75</sup> Due to the increased labor and time required to apply the ear notches and read them, this procedure is not commonly used in commercial settings. Ear notching is mostly used by small purebred breeders and 4-H pig breeders.

## EAR TAGS

Ear tags may carry a visual number and/or an electronic transponder.

## INJECTED TRANSPONDERS

Small transponders may be injected beneath the skin at the base of the ear<sup>73,76</sup> or intra-peritoneally. Injected transponders may result in inflammation or infection in some cases. Larger transponder size may cause more severe reactions.<sup>73,77</sup> Large transponders positioned at the base of the auricle also have a higher rate of loss, possibly because of inadequate application with insufficient needle penetration leading to a transponder that remains near the application point, facilitating its loss.<sup>71,77</sup>

## TATTOOS

Pigs may be tattooed with an identifying number.<sup>78</sup> Tattooing causes stress in pigs, which may be reduced by refinement of equipment and techniques.<sup>79</sup>

## SUMMARY

Individual animal identification is desirable for tracking and ensuring good care. There has not been a comparison among identification systems on the basis of pain and other welfare parameters, and this should be included as part of an ongoing refinement process. Ultimately non-invasive methods such as biometric identifiers or DNA tracking may become available.<sup>80,81</sup>

## CONCLUDING STATEMENT

Most invasive procedures performed on piglets are done to protect the welfare of the pigs rather than to improve production.<sup>82</sup> However, many of these procedures are widely considered to be painful for swine and the development of refinements and alternatives is desirable. Prophylactic removal of teeth, and to some extent tails, is becoming less common as less invasive alternatives become available. Where procedures that cause pain are still necessary, the use of analgesia and/or anesthesia should be encouraged wherever this is of net benefit to the animal.

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