



Effects of neonatal castration on social behaviour, human–animal relationship and feeding activity in finishing pigs reared in a conventional or an enriched housing



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ABSTRACT

Raising entire males is already common in a few European countries. It has the advantage of avoiding the pain of castration. Entire males have also a better food conversion. However, they would be more aggressive than castrates which causes welfare troubles. The consequences for human–animal relationship are not clear. We thus wanted to determine the effects of raising entire males in stable groups compared to castrated males on their social behaviour (including agonistic behaviour, non-agonistic behaviour, play, belly-nosing), the human–animal relationship and the feeding behaviour during the fattening period. We also determined the effects of an enrichment of the housing (space, outdoor run, straw) on the same behavioural activities. Eighty males (groups of 10) were studied: 40 castrated (surgically) at 5–6 days of age and 40 left entire, half of each reared in a barren (1 m²/animal, slatted floor) and half in an enriched (2.5 m²/animal, straw bedding and outdoor run) housing. We observed their social activity by continuous sampling three times a month for 1 h from 3 to 5 months of age. We also measured their feeding activity three times a month for 24 h. The three observations for a same month were pooled. We evaluated their relationship to humans at 80 and 150 days of age by measuring the manageability (during displacement, saliva collection and weighing) and the reaction to the presence and departure of an unfamiliar human after isolation in a test pen (1 m × 6 m). Entire males expressed more social activities and were more aggressive than castrates only at 3 months of age. They were more attracted by the unfamiliar human but not aggressive towards him, and not more difficult to handle. They expressed a reduced feeding activity. Whatever the gonadal status, pigs from the enriched environment were observed more often playing, were less attracted by an unfamiliar human in a test pen. They were also easier to handle during weighing. Enriching the environment reduced agonistic behaviour of castrates and induced more difficulties to handle castrates during saliva collection, but had no effect on these behaviours in entire males. However, it decreased the feeding activity of entire males. In conclusion, we did not show any strong behavioural negative consequences of rearing entire males in stable groups. Our enrichment did not modulate so much the social behaviour of entire males, but decreased their feeding activity.

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1. Introduction

In most European countries, 80–100% of male pigs are castrated in conventional production (Fredriksen et al., 2009), the majority of them by surgical castration without anaesthesia. Surgical castration without anaesthesia is a source of intense pain that impairs welfare and is questioned for that reason (Prunier and Bonneau, 2006; Von Borell et al., 2009; Rault et al., 2011). One of the alternatives to piglets' surgical castration is raising entire males (Von Borell et al., 2009). Raising entire males is already common in a few European countries like United Kingdom, Ireland and Spain (Fredriksen et al., 2009).

On the one hand, there are many advantages of raising entire males (Rault et al., 2011). It does improve animal welfare at young age, due to the absence of surgery. It saves some time for stockpeople. It also has economic benefits because entire males have a better feed conversion (Pauly et al., 2009). In addition, the feeding activity is lower (Cole and Chadd, 1989; Cronin et al., 2003) and carcasses are leaner (EFSA, 2004; de Roest et al., 2009).

On the other hand, there are some disadvantages of raising entire males. The welfare of the animals seems to be impaired due to sexual mounting (Cronin et al., 2003) and to a higher aggressiveness in entire males compared to barrows (at 17 and 21 weeks of age and immediately after weaning; Cronin et al., 2003; Llamas Moya et al., 2008). Fighting before slaughter may be a source of carcass damages leading to financial losses (de Roest et al., 2009). Also, the meat quality can be a problem for consumers due to boar taint (e.g. Font i Furnols et al., 2009). In addition, entire males are considered to be more difficult to manage (EFSA, 2004) and sometimes dangerous due to aggressiveness. However this has never been confirmed with scientific studies. This is an important point to evaluate because the relationship with humans influences animal welfare and human safety (Boivin et al., 2003), but also meat quality (Terlouw et al., 2007). Sexual development has a large influence on animal behaviour (EFSA, 2004) and thus its implication in the human–animal relationship would not be surprising. Some data showed that there is an influence of sex on fear of humans in sheep (Boissy et al., 2005). Nevertheless, the influence of sexual development, except the male/female difference, has never been studied to our knowledge.

There have been some attempts to solve behavioural problems (aggressiveness, mounting, skin lesions) of entire males by modifying the management. For instance, there are positive effects of raising males in stable groups from weaning to slaughter (Fredriksen et al., 2008). Split marketing (i.e. marketing part of the pigs of each group according to their weight), on the contrary, has been found to reduce animals' welfare (Boyle and Björklund, 2007). Enriching the environment (space, bedding) could be a solution as it is generally favourable for animal welfare notably by decreasing aggressiveness (Van de Weerd and Day, 2009) and decreasing redirected investigations like belly-nosing towards conspecifics (De Jong et al., 1998), while increasing locomotor play (running) and environmental exploration (De Jong et al., 1998). Furthermore, it could decrease the development of boar taint (Fredriksen et al., 2008).

Consequently, the aim of the present study was two-fold. We firstly wanted to determine the effects of raising entire males in stable groups compared to castrated males on their social behaviour (including agonistic behaviour, non-agonistic behaviour, play, belly-nosing), the human–animal relationship and the feeding behaviour during the fattening period. We secondly wanted to determine the possible effects of an enrichment of the environment (space, outdoor run, straw) on the same behavioural activities. The development of the immune system of those animals (Merlot et al., submitted for publication) and the sexual development and effects on meat quality and stress hormones will be presented elsewhere.

2. Material and methods

The current experiment was conducted in accordance with the International Guiding Principles for Biomedical Research Involving Animals (National Research Council (US), 2004). Furthermore, the complete experimental procedure was approved by the local ethic committee (Comité Rennais d'Éthique en matière d'Expérimentation Animale – number b-2009-AP-01).

2.1. Animals and rearing conditions

The experiment was held at the experimental farm of the PEGASE Research Unit (Saint-Gilles, France), in two replicates (March–June and September–December 2009). In each replicate, a total of 40 male piglets (Large White × Landrace) × Piétrain from 12 (first replicate) or 13 (second replicate) litters were used. Half of the animals were castrated with local anaesthesia during the first week of life, they were chosen according to their birth weight so that the mean was similar for entire and castrated males. We excluded the smallest and largest male piglets of the litters. From birth to weaning at 28 days of age, piglets were raised in conventional farrowing pens. From weaning, piglets were allocated to their experimental group. The allocation into the experimental groups was done so that the mean (and variability) weight at weaning was similar between the groups (8.9 ± 0.3 kg for replicate 1, 8.6 ± 0.2 kg for replicate 2), and in order to allocate pigs from the same litter in different experimental groups. They were kept in the same groups until slaughter, even during transport. Seven weeks after weaning, animals were ear-tagged with a number written to recognise each individual (from 1 to 80) and a chip was implanted (see Section 2.2.2). Throughout the experiment, animals were housed in groups of 10 pigs. The four experimental treatments were defined by the gonadal status of the animals (entire males or castrates) and their housing during the fattening period (conventional or enriched):

- Castrates in a Conventional housing.
- Castrates in an Enriched housing.
- Entire males in a Conventional housing.
- Entire males in an Enriched housing.

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