Differences in aggressive and sexual behaviour in entire male pigs versus barrows

Tuyttens, FAM¹, De Groot, J², Van Reenen, K², De Bourdeaud’huy, A¹ and Struelens, E¹
¹ Institute for Agricultural and Fisheries Research, Melle, Belgium
² Animal Science Group, Wageningen UR, The Netherlands

Introduction
Surgical castration of male piglets in order to prevent boar taint is being increasingly criticised on the grounds of various animal welfare concerns (Tuyttens 2002; Prunier et al. 2006). Up to present, mainly the negative and short-term consequences of castration have been considered such as the stress and pain during and shortly after surgical castration. However, castration may also have a welfare benefit as it likely reduces aggression (Rydhmer et al. 2006; Velarde et al. 2007). This is particularly relevant for one of the alternative strategies that is being explored in Belgium (as in some other countries), namely the reduction of boar taint by on-farm management alterations combined with the detection of boar taint at the slaughter-line (Aluwé et al. 2008; Bekaert et al. 2008). If carcasses with boar taint can reliably be detected and removed from the normal food chain, it may no longer be required to castrate male pigs which is the most natural production system as the physiological and behavioural integrity of the boars is left intact. But if the social behaviour of entire males is very different from that of barrows, the overall animal welfare benefit of this alternative strategy may be less than expected unless their housing and management conditions can be adapted adequately.

The objective of this study was therefore to investigate the changes in social behaviour following castration in more detail in order to contribute to a more complete cost-benefit analysis of surgical castration and the various alternative strategies to deal with the boar taint problem. More specifically, the following hypotheses were tested:

H1: Perinatal castration of male piglets reduces sexual and agonistic behaviour post-weaning.
H2: The age of castration (3 days versus 3 weeks) influences these behavioural changes.
H3: The gender at which social interactions are directed is affected by castration.

Materials and Methods
We randomly assigned 24 litters of piglets to one of the following three treatments: all male piglets were surgically castrated at day 3 (early), at week 3 (late), or were not castrated (control). The litters were raised separately from birth to slaughter. The pigs were weaned at 4 weeks and moved from nursery pens to fattening pens when they were 10 weeks old. For every group and every 4 weeks (starting when the pigs were 5 weeks old until they were 21 weeks old) we made 4-hour video recordings on the Tuesday or Wednesday spread during 8 and 15 o’clock. On the preceding Monday the pigs were colour marked to allow individuals to be recognised on video. All recordings of sufficient quality (318 hrs in total) were analysed using the Noldus Observer software. We used behaviour sampling rule and continuous recording to quantify the occurrence of two classes of social interactions: aggressive interactions (which included behaviours such as biting and pushing) and sexual interactions (which included behaviours such as anogenital sniffing, attempted mounting and mounting). The identity of the initiator (actor) and receiver of social interactions was also recorded. For interactions initiated by females and males separately, we tested whether the fraction of interactions with female receivers was affected by treatment.

Results
The frequency of aggressive and sexual behaviour did not differ significantly between early and late castration treatment. The frequency of aggression tended to be higher in the control than the castration treatments, but the difference was significant only during week 5 (P<0.001) when the level of aggression, or activity in general, was highest. Sexual behaviour tended to be more frequent in the control versus castration treatments as well, but the difference was significant during the last week only (P<0.01).

The gender of the receiver at which female pigs directed their social interactions was not affected by treatment. However, for social interactions initiated by male pigs several treatment effects were found. In comparison with entire males, barrows directed a greater proportion of their aggressive interactions at females in week 5 (P<0.05) and this difference disappeared as they grew older. Moreover, barrows
directed a smaller proportion of their sexual interactions at females in week 21 (P<0.05). A difference was also found between early and late castrates concerning their gender preference for sexual behaviour. Compared to late castrated males, a smaller proportion of sexual interactions initiated by early castrated ones was directed at females but this difference was significant only in week 9 (P<0.05) and nearly significant in week 17 (P<0.1).

Discussion

Regarding the first hypothesis we conclude that castrating male pigs indeed reduces aggression among littermates during the time they are kept in the nursery pens, and that it also reduces sexual behaviour when they reach puberty. Both behavioural alterations can be interpreted to be beneficial for the welfare of closely confined litters and ought to be taken into account in the cost-benefit analysis of surgical castration and the alternative strategies to deal with the boar taint problem. The magnitude of these behavioural changes may be greater than reported in the present study when litters are mixed. If male piglets would no longer be castrated their housing and management conditions may need to be adapted if we are to optimise animal welfare and production performance.

Regarding the second hypothesis we could not show that the frequency of aggressive or sexual behaviour was affected by the age of castration. In other species it has been shown that if castration is performed before the critical period in which the defeminisation of the male nervous system takes place the behavioural effects are greater than when the animals are castrated after this critical period. In many species this critical period is around birth and is characterised by a peak in testosterone, whereas in pigs it seems to occur more slowly and progressively (Tuyttens 2002).

Regarding the third hypothesis we conclude that the gender at which male pigs direct their social interactions is affected by castration and by the age of castration. Castration seems to alter the attitude of male pigs concerning female littermates: at a young age they are seen more as a competitor while at a later age, when they reach puberty, female littermates become less attractive for directing sexual behaviour at. The tendency of early versus late castrates to direct a smaller proportion of their sexual interactions at females, might indicate that early castrates are more feminine than late castrates. This would make sense given the slow and progressive sexualisation of the nervous system of male pigs.

References


