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Considering the 3Rs for castration and tail docking in sheep

Background: Tail docking and castration in lambs are permitted in the UK and are governed by multiple legislations including the Protection of Animals (Anaesthetics) Act (1954), the Veterinary Surgeons Act (1966), the Welfare of Livestock Regulations (1982), the Animal Welfare Act (2006) and the Mutilations (Permitted Procedures)(England) Regulations (2007). However, with political uncertainty and increasing consumer interest in how red meat is produced, the changing global agenda with reference to mutilations will mean that such procedures in the UK are increasingly under the spotlight and may require increasing justification on farm. Notably, the pain caused by these mutilations and their blanket use in regards to sheep production feature on the agenda of several animal welfare charities, including Compassion in World Farming and People for Ethical Treatment of Animals.

Aim of the article: With over 10 years since the publication of the Farm Animal Welfare Council's (FAWC) report discussing the implications of these mutilation procedures on the welfare of lambs (FAWC 2008), and the recent publication of the BVA's policy on tail docking and castration (BVA 2020), in this article we will review the debate. Key areas that are considered include the changes in perception of mutilations; the developments in the evidence since the FAWC's publication; the current legislation and how global practices adhere to these rules; the European perspective of mutilations; and how the 'reduce, refine, replace' (3Rs) approach can be applied to mutilation discussions when preparing health plans. The arguments surrounding this topic are complex and the ultimate driver for any discussion on farm should be maximising overall animal welfare.

Why is tail docking required?

Tail docking in sheep is a long-standing practice in lowland breeds, with docking performed so that the tail is of a length just above the hock. The procedure is commonly practised as a tool to manage faecal soiling to reduce the risk of blowfly strike (myiasis) (French and others 1994), and it also reduces the time taken to shear sheep (Scobie and others 1999).

Indeed, myiasis is undoubtedly a significant welfare concern for sheep. Over 75 per cent of sheep flocks in the UK have reported incidents of flystrike in any given season, and an incidence of 1.6 per cent of sheep within each flock (French and others

1992, Bisdorff and others 2006). Breech strike is the most common form of flystrike (Wall and Lovatt 2015) and there is evidence that soiling increases the risk of flystrike 8.5-fold (French and Morgan 1996). French and others (1992) and Bisdorff and others (2006) demonstrated the protective effect of tail docking against flystrike; however, there is also some contrary evidence demonstrating no perceived benefit (Ware and others 2000).

Tail length recommendations

When considering the appropriate length of a sheep's tail, UK recommendations state that there must be sufficient tail to cover the vulva in female sheep and anus in male sheep (Mutilations (Permitted Procedures)(England) Regulations (2007)) (Fig 1). This practice varies globally, with shorter tails permissible in other countries, including Australia and New Zealand. Fisher and others (2004) examined relative tail lengths (ie, no tail or short and medium-length tail to cover the vulva and anus or longer) and the relative risk of strike for each of these. They found that the lowest risk category was tails of medium length; this was thought to be driven by increased clearance of faecal dags compared to those of the other tail lengths measured.

KEY LEARNING OUTCOMES

After reading this article, you should understand:

- Why tail docking is required and the recommendations regarding the procedure in the UK;
- The specific techniques used for tail docking and castration;
- Pain responses to tail docking and castration methods;
- Current UK, European and New Zealand/Australian legislation regarding mutilation procedures in sheep;
- The principle of the 3Rs and strategies for reducing, refining and replacing the need for these mutilation procedures.

Consequences of shorter tail length

There are other consequences of shorter tail docking. For example, Graham and others (1947) found that urine staining was also increased with very short tail lengths. Likewise, there is an increased risk of rectal prolapse (Thomas and others 2003), and also evidence of an increased risk of erysipelas (joint-ill) in New Zealand (Lloyd and others 2016). Earlier studies showed that coccygeal muscles extend to the tip of the exposed skin on the underside of the tail, and docking shorter than this reduces the muscle mass available for tail movement and strength, potentially increasing the risk of prolapse (Graham and others 1947). However, the evidence for this is not extensive.

Drivers for tail docking

Traditional methodology, system type and breed are all drivers of tail docking. Some breeds are naturally short-tailed and do not require docking (ie, the primitive breeds), whereas some breeds are traditionally left undocked, such as hill breeds and Wiltshire horns.

Hill breeds are often left undocked due to the environmental conditions that they are exposed to; longer tails offer more protection against extreme weather conditions and the extensive lambing systems under which hill breeds often operate. Wiltshire horns are left undocked due to their natural wool-shedding ability and reduced risk of daggings and subsequent myiasis. The same applies to other UK shedding breeds/composites, including the exlana, easyCare and dorpers.

Additionally, the management of breeds also influences whether they are commonly docked; for those flocks whose management is particularly extensive at lambing time, some may choose to leave lambs undocked to reduce labour during this busy period.

Why is castration required?

Castration is commonly practised in ram lambs for the following reasons:

- Castrated males are easier to manage due to eliminated sexual behaviour and reduced fighting;
- When all males are castrated there is an eliminated risk of misalliance with their female peers (or their mothers in the case of early maturing breeds that are capable of out-of-season breeding, such as poll Dorsets);
- It allows male and female lambs to be managed together, reducing the number of management groups needed over the winter management period;
- Running castrated males facilitates the sale of store lambs on the open market as they do not require separate management groups;
- There is no risk of ram taint in rams who have been castrated.



Fig 1: The tip of the flesh-covered triangle demarcates the end of the coccygeal muscles and acts as a landmark for tail docking

Ram taint

Ram taint is detected by some consumers as an undesirable characteristic, and is caused by testosterone and skatole in the fat of the meat (Craigie and others 2012, Schreurs 2013). This has the potential to reduce the consumer eating experience and is likely to have a long-term detrimental consumer preference for lamb, thus reducing demand.

Geographical variation in castration levels

We have noted that there is a geographical variation in the proportion of ram lambs that are castrated, irrespective of the breed. For example, there are lower numbers of ram lambs castrated in Wales due to the belief that entire rams have faster, and therefore more efficient, growth rates. Conversely, castration is more widespread in England due to concerns about ultimate carcass conformation and misalliance within flocks.

Mutilations in the UK under current legislation

The UK legislation is well established with reference to mutilations for livestock species.

Tail docking

The tail docking of lambs is covered by the Mutilations (Permitted Procedures) (England) Regulations (2007), which states that in all cases the remaining tail must be sufficient to cover the vulva of a female animal and the anus in a male animal. It also states that devices which constrict the flow of blood to the tail, such as rubber rings, may only be used in animals less than seven days old. When any other method is used for tail docking, anaesthetic must be used to comply with the law.

Castration

If castration is performed when the ram is over three months of age it is deemed an act of veterinary surgery and therefore must only be carried out

by a veterinary surgeon (Veterinary Surgeons Act 1966), and an anaesthetic must be administered (Mutilations (Permitted Procedures) (England) Regulations (2007)). An anaesthetic must also be used in younger animals (over seven days old) when the method of castration involves constricting the blood supply, such as with a rubber ring or another device.

Specific mutilation techniques

The UK does not prohibit any specific techniques for tail docking or castration of lambs. Recognised techniques for tail docking include rubber ring application, hot-iron cautery, bloodless docking (using a burdizzo device) or surgical removal of the tail using a scalpel or knife (performed either by a veterinary surgeon or stockperson).

Methods for castration of lambs include rubber ring application (Fig 2), bloodless castration (using a burdizzo device), or surgical castration (Red Tractor 2018).

Immunocastration vaccines (otherwise known as anti-gonadotrophin-releasing hormone [GnRH] vaccines) have been licensed in pigs and used in cattle. While these vaccines are not currently licensed in sheep, they have been trialled (Masłowska 2017).

Pain

Tail docking and castration techniques stimulate nociceptors by causing tissue damage and by triggering physiological pain pathways. Inflammatory mediators are released locally at the site of tissue damage, leading to peripheral sensitisation. Sustained nociceptor activation can lead to central sensitisation and consequently, hyperalgesia and allodynia. Constant repeated unmyelinated C-fibre stimulation can lead to a phenomenon referred to as 'wind-up', where dorsal horn neurone response is increased and is prolonged after the stimulation has ceased (Meintjes 2012).

Assessment of pain caused by mutilation procedures in lambs is often performed by measuring blood cortisol concentrations and behavioural responses. However, there are limitations to both of these methods. There can be variation in both the range of displayed behaviours between castrated or docked lambs (Fig 3) and in how developed this behavioural response is in individual neonates.

Cortisol levels can be used to assess acute pain, but they display a 'ceiling effect', above which it becomes challenging to accurately grade severe pain (Molony and others 2002).

Tail docking pain responses

When comparing the different techniques for tail docking, rubber ring and hot-iron cautery have been shown to produce similar plasma cortisol responses.



Fig 2: Rubber ring application for castration should be at the neck of the scrotum, avoiding the teats and ensuring both testicles are within the scrotum



Fig 3: Newborn lambs demonstrate pain behaviours when tail docked and castrated, including increased vocalisation and rolling. There is often concern about the risk of mismothering when performing these procedures, especially with recently castrated male lambs; the ewe may wander off leaving the lamb unattended, increasing the risk of separation

However, lambs are more active after cautery docking, suggesting that rubber ring docking may be more painful (Stafford 2017). Furthermore, cold-knife docking has been shown to cause a much greater cortisol response and is generally discouraged as a practice (Mellor and Stafford 2000).

Castration pain responses

Rubber ring castration produces a smaller plasma cortisol peak than surgical castration; however, wound healing is slower with this technique. Lambs still show behaviour of turning to look at their scrotum six weeks after rubber ring castration, suggesting chronic pain (Stafford 2017). There is also some evidence of neuroma formation in docked sheep (Sutherland and Tucker 2011).

Bloodless castration (using a burdizzo) creates a similar cortisol response to rubber ring application (Dinniss and others 1997), but lower cortisol levels than those produced by surgical castration (Mellor and Stafford 2000). Using a rubber ring and burdizzo device at the same time for castration has been shown to reduce the pain experience in one-

week-old lambs, but not in older animals (Dinniss and others 1997, Mellor and Stafford 2000).

Short scrotum castration

Short scrotum castration is a method whereby the distal scrotum is removed with a rubber ring and instead of the removal of the testicles, they are forced into apposition with the body wall. This reduces the ram lambs ability to thermoregulate the testicles, while also compromising semen production. The latter reduces the impact of the sexual behaviours and there are multiple studies that have demonstrated the relative infertility of these males (summarised by Clements and Bright 2010).

It has also been demonstrated that there are carcass trait advantages from the remaining circulating testosterone, such as improved carcass weight and conformation, without the need for distinct management of these males. However, it is also worth mentioning that we have experience of cases of misalliance in sheep and cattle where such males have inadvertently been left in the flock/herd following ineffective ring application and subsequent retained fertility.

There is evidence that using the short scrotum castration technique is significantly less painful than complete ring castration (Clements and Bright 2010) and, as such, confers a welfare advantage over other techniques.

However, there are questions around what level of infertility is required to justify recommending this as a technique to farmers; in reality, if there is a chance animals may not be infertile as a result of this method, then are we just exposing lambs to this technique purely for production benefit? Can this be justified?

If these short scrotum males themselves require distinct management, then this procedure in our opinion is not justifiable from a welfare perspective (ie, the pain of the procedure produces a less than clear management advantage).

Anaesthesia and analgesia

Anaesthesia and analgesia options that are currently available for use during mutilation procedures include:

- Infusion of local anaesthetic into the spermatic cord;
- Infusion of local anaesthetic subcutaneously above the site of band application; or
- Hot-cautery iron application.

During tail docking, ideal anaesthesia would include epidural of the tail which may be possible for individual cases if performed by a vet, but this should not be delivered by farmers. The law does not state the degree of anaesthesia required, or whether retrospective application is sufficient; however, it is likely that this should be given before

the procedure. There are currently no anaesthetics or analgesics that are licensed for use in sheep in the UK, but these can be used on the cascade.

Global view point on mutilations

UK exports

The UK is a net exporter of lamb and mutton, with 67,982 tonnes exported in 2018–19. Of those exports, 95 per cent are destined for European Union (EU) markets and the remaining 5 per cent destined for non-EU countries, including Hong Kong, Ghana and Jordan (AHDB 2019). These figures demonstrate the reliance on EU trade for the UK sheep industry. The top three EU countries that the UK exports to are France, Germany and the Republic of Ireland. However, UK standards with reference to tail docking and castration are not wholly aligned with those of these EU member states.

EU regulations

There are no EU-wide regulations with reference to animal welfare law. EU guidelines originate from the Council of Europe's (COE) recommendations (COE 2019); these state that, where needed, tail docking and castration should ideally be performed with haemostatic tongs or via surgical procedures. It also says that while rings are permissible, they should be avoided where possible and that local legislation should ultimately be referred to.

European attitudes towards tail docking and castration vary hugely across Europe and this accounts for the variation in acceptable practices. It is worth noting that both tail docking and castration are banned in multiple EU countries, including those that import a significant proportion of UK sheep meat. Furthermore, in some countries where the procedure is permissible, the use of rubber rings is specifically legislated against (Hannemann and others 2017, COE 2019) (Table 1).

New Zealand and Australian regulations

It is also worth considering that while the UK is a net exporter, approximately 8000 tonnes of sheep meat was imported into the UK in 2018, largely from New Zealand. The legislation varies between Europe and New Zealand, with farmer-administered tail docking legally permissible until lambs are six months old in New Zealand (and three months old in Australia). After this period, only a veterinary surgeon can remove a sheep's tail. Tails must not be flush with the tail head (ie, not docked very short), and no anaesthesia is required.

However, it is important to acknowledge that while the legislation extends to this length of time, in practical terms it would be of little commercial or management advantage to delay tail docking to this extent, or indeed beyond the UK limits of three months (after which it has to be performed by a veterinary surgeon). Indeed, it is not a common practice to do so. Nevertheless, this does highlight



Farm animal

Table 1: Top six European Union countries that import UK sheep meat products (lamb and mutton), highlighting the tonnage per annum and whether mutilation procedures (castration and tail docking) are permissible in these countries

Country	Import volume of UK sheep meat products (tonnes per annum)	Tail docking	Castration
France	30,500	Permitted	Permitted with local anaesthetic
Germany	16,223	Permitted in individual cases	Permitted, but rubber rings are banned
Republic of Ireland	9241	Permitted	Permitted
Belgium	7200	Permitted in females, only if performed by a veterinary surgeon	Permitted by a veterinary surgeon under sedation only
Netherlands	5208	Not permitted	Not permitted
Italy	2652	Not permitted	Not permitted

the variation in global legislation for sheep sold within the same trade market.

Mutilations in other livestock sectors and how things are changing

There have been significant amendments to practices within other sectors in regards to mutilations.

Pig sector

The pig industry across Europe is governed by the European Commission (EC) Council Directive 91/630/EEC, and its subsequent amendment 2001/93EC requires an emphasis on preventative strategies before implementation of mutilations, in addition to other welfare improvements.

The UK was an early adopter of these amendments in the pig sector, which require an emphasis on reducing the underlying risk factor behaviours that can lead to problems (such as animals suffering from boredom which can potentially lead to tail biting). Ultimately, although the mutilation may still be necessary at some point, significant effort should have been taken before this to reduce the necessity of having to perform the procedure at all. Consequently, the decision to dock tails in the pig industry should be a decision that is discussed with the herd's veterinary surgeon as part of the health planning and annual review process. The industry has had to demonstrate reduction.

Dairy and beef sectors

The dairy and beef sectors have also had to demonstrate refinement of their mutilation procedures with reference to routine disbudding and castration of calves. The Mutilations (Permitted Procedures) (England) Regulations (2007) state that while calves under seven days old may be disbudded with chemical disbudding agents, any other technique must be accompanied with local anaesthesia. However, since 2017, the British Cattle Veterinary Association (BCVA) has advocated the role and benefit of NSAIDs in addition to local anaesthesia in all disbudding and castration to refine the procedure (BCVA 2017).

Goat sector

Similarly, the Goat Veterinary Society (GVS) has also recommended the use of analgesics in addition to anaesthesia for routine kid disbudding, and advocated the use of off-licence medicines in accordance with the cascade (GVS 2018).

Consumer perception

Animal welfare is an important consideration for the consumer, with 59 per cent of consumers in one study being willing to pay more for 'animal welfare-friendly' products (EC 2016). Furthermore, 93 per cent of participants across the EU agreed that the standards of imported meats should meet the same standards are those applied within Europe (EC 2016).

However, German and Polish pig meat consumers prioritised price, meat quality and safety above animal welfare or environmental considerations (Grunert and others 2018). In a study of consumer opinions of labelling under European standards, key pieces of information on packaging which were valued by consumers included the origin of the product, the use-by date and, increasingly, the production system used and the product's traceability (Bernués and others 2003).

Likewise, it is also important to look further afield when considering the changing attitudes towards other mutilations; for example, mulesing, which is the removal of excess skin at the tail head of merino sheep to reduce the risk of myiasis in skin folds. While this procedure is distinct and does not resemble tail docking or castration, public attitudes towards mutilations may have some overlap – mulesing practices have faced criticism and have moved up the animal welfare agenda with the general public in Australia. Indeed, multiple clothing retailers in Australia have banned the sale of products originating from flocks in which mulesing is practised (Malek and others 2018).

Principle of the 3Rs

The 'principle of the 3Rs' was a concept originally described by Russell and Burch (1959) for application within animal research science. The



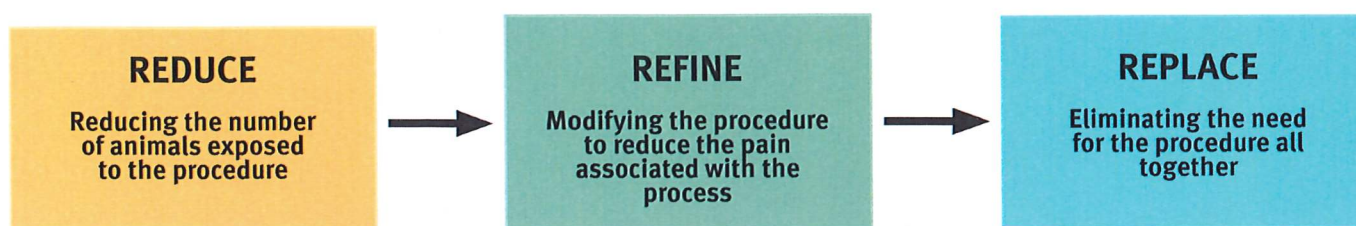


Fig 4: Explanation of 'the 3Rs' – reduce, refine, replace. Originally developed in the laboratory context, they can be applied to the tail docking and castration conversation to promote discussion and progression towards replacing these procedures as the end goal

key principles are 'reduce, refine and replace', and were first created to be applied to laboratory scenarios where the use of animals was absolutely necessary (Fig 4). Subsequently, the principles have been applied to other areas of animal production, including discussions on antibiotic use and mutilations.

In the original context, 'reduction' refers to the number of animals exposed to the technique. 'Refinement' was to be applied to scenarios where the procedure couldn't be replaced; rather, how could the procedure be modified to reduce the amount of distress applied to animals which were exposed to the particular procedure. Lastly, 'replacement' referred to using alternative techniques or materials to mitigate the need to use animals for research.

In the context of mutilations in sheep, the ultimate goal is to reach 'replacement'; that is, finding other strategies that could be used to reduce the risk of myiasis or the negative consequences of managing entire males (thus also reducing the need of mutilations altogether).

Although some may lobby for complete reduction and replacement, as seen in many other sheep-producing countries in Europe, there are factors which may mean that is inappropriate as a blanket policy in the UK. For example, some environmental factors that are shown to increase myiasis, such as temperature and humidity (Pitts and Wall 2004), may be reasons why reduction may not be achievable in the UK; however, there are studies which conflict the environmental arguments (Broughan and Wall 2004, Bates and Hunter 2019). Ultimately, the risk factors for myiasis are multifactorial and an initial emphasis on refinement and reduction may lead to the confidence for reaching ultimate replacement in the future.

Strategies for reduction

Castration

We can reduce the proportion of ram lambs castrated per annum by leaving single-born lambs and reared lambs which are born in the beginning of the lambing period entire on farms that are capable of finishing lambs. These lambs are likely to be finished pre-weaning or before achieving sexual maturity.

This principle could also be applied to early

maturing breeds, such as poll Dorsets born out of season. Where ram lambs are kept entire, a prompt weaning date in early maturing breeds is essential to avoid misalliance with adult ewes pre-weaning. We have experience of such misalliance in ram lambs younger than 14 weeks old, especially where the dam's breed is capable of breeding out of season.

Tail docking

Reducing the proportion of lambs needing to be docked can be achieved by applying greater emphasis on the other areas of myiasis control. These could include:

- Management of parasitic gastroenteritis;
- Reduced soiling by dagging;
- Lameness control;
- Strategic timing of shearing (or using specific wool-shedding breeds); and
- Frequent flock inspection (Wall and Lovatt 2015).

Many hill breeds and some lowland breeds don't dock tails due to the risk of extreme weather exposure and extensive management at lambing. For other breeds there may be reluctance not to dock, particularly in female replacements, due to the impact on marketing of stock. There may also be reluctance by shearers to leave sheep undocked due to the documented increase in shearing time for sheep with long tails (Scobie and others 1999), which in itself is a source of stress for sheep.

Currently, there is no work comparing the relative importance of management procedures on reducing the risk of flystrike; however, as shown in the pig industry, demonstrating the implementation of other areas of effective control is essential for rationalised use. Moreover, the effectiveness of reduction strategies can be assessed by monitoring the number of flystrike cases per annum.

Strategies for refinement

Castration

Infusion of local anaesthetic into the neck of the scrotum before castration has been demonstrated to reduce the acute response to the procedure. In a study by Kent and others (2004), it was shown that although administration of local anaesthesia increased the time taken to castrate, it also reduced pain-related behaviours following the procedure. It

should be noted that there was a variation in lamb behaviours, with 15 per cent of lambs failing to show any response in rubber ring tail docking (Kent and others 2004). This study demonstrated a 20 g per day weight gain advantage over a 32-day period when lambs were given local anaesthetics (equating to 640 g per lamb).

For this refinement strategy, the challenge for farmers will be the time taken to effectively administer anaesthesia before the procedure, and the lack of licensed anaesthetics for sheep in the UK (Case study 1).

Anaesthetics and NSAIDs

Procaine can be used under the cascade, and lidocaine can be used under the cascade where procaine is not available (as licensed for use in food-producing equids). While toxicity values of procaine are not known in sheep, 18 mg/kg is often cited as a toxic level for lidocaine in neonatal sheep, so caution should be applied (Morishima and others 1981). We commonly use 0.5 ml per side of the scrotal neck and a total volume of 1 ml for a 4 kg lamb.

NSAIDs are advocated for use in castration and disbudding in other species to reduce the impact of chronic pain. NSAIDs can be used under the cascade, but small syringes should be used to ensure accuracy of dosing and should only be used in lambs that are otherwise clinically well.

Some farmers may resist the use of local anaesthesia because of the practicality of achieving anaesthesia in flocks with large numbers of lambs without the risk of introducing iatrogenic infection. However, there is an applicator called 'Numnuts' (CSIRO and Moredun Scientific) (see useful resources) that is being developed to deliver targeted pain relief by applying local anaesthesia into the neck of the scrotum and tail, before rubber ring band application.

The 'Numnuts' system was designed for tail docking and castration in Australia in older lambs. However, this technology is not currently available in the UK and, moreover, it is important to remember that in the UK the law states that rubber rings cannot be applied to lambs older than seven days old (The Mutilations (Permitted Procedures) (England) Regulations (2007)).

Tail docking

The 'Numnuts' system described above is also applicable to tail docking; however, alternative methods include local injection at the site of banding by the farmer, or epidural if the procedure is to be performed by a vet. A topical anaesthetic has been developed and licensed in Australia (Tri-Solfen, Bayer Australia/New Zealand) for application after mulesing or hot-iron tail docking. This lidocaine-based product is not currently licensed in the UK and it is not clear if this

CASE STUDY 1: USING 'REFINE' STRATEGIES

David Cotterell manages a flock of 400 Lley ewes on Kingston Maurward College farm, Dorset. Both Charolaise and Lley rams are used. The flock lambs inside during February and March, with the majority of lambs finished on grass and a selection of purebred females being kept for future breeding.

David tail docks and castrates to simplify field and group management in this mixed business. David has been using local anaesthetic when castrating lambs for over 10 years and has found that the pain relief ensures that the lambs are able to return to suckling much quicker. The 0.5 ml dose of local anaesthetic is injected through the centre of the ring at the top of the scrotum once the ring has been put in position. The farm has an open lambing weekend during which the public are shown castration and tail docking procedures. Students at the college are actively encouraged to use these pain-relief methods and the college considers it important to show members of the public, particularly during their open weekend, that they use a higher welfare procedure.



CASE STUDY 2: USING 'REDUCE' AND 'REPLACE' STRATEGIES

Nick Wakely farms 2000 North country mules in Somerset and lambs in April. The flock is an open flock, buying in female replacements, with 80 per cent of lambs being sold via a local abattoir and the remaining animals being sold via local markets.

Since 2016, Nick has not been castrating ram lambs and manages them separately from weaning until finishing. The main motivator for this change was aiming to reduce the pain behaviours and perceived risks of predation (ie, lambs being taken by foxes while recovering from the procedure), or mismothering of lambs following castration.

Nick contacted his local abattoir before making this change to ensure there would be no penalty for sending entire males. Nick has found that entire ram lambs will achieve heavier weights quicker, and while they may be slower to put on 'finish', there is no premium for a fat 'level 3' on the EUROP scale, whereas there is a premium for 'E' and 'U' conformation classes which males can easily achieve.

There has been no economic penalty for managing entire males separately, provided there is sufficient paddocks and infrastructure to manage bachelor mobs. While Nick largely finishes his lambs, if he decides to sell store lambs he ensures that he declares any entire males (he would retain them on farm) and sells female lambs to market instead.



CASE STUDY 3: USING 'REPLACE' STRATEGIES

Tim White runs a flock of 750 exlana ewes and 70 Charolais ewes in Wiltshire, on an extensive outdoor lambing system. Exlana sheep are a wool-shedding breed and are actively selected for low dagging scores. Consequently, tail docking is not a priority as part of his myiasis management plan. However, Tim has been actively selecting for animals with shorter tails and is targeting a length of 10 to 15 cm as a prospective desirable trait for potential vendors. All ram lambs are left entire as Tim aims to sell breeding rams – surplus entire rams are marketed via a processor as they have higher growth rates and a leaner carcass. Tim is able to manage them separately and does so from weaning. He has noticed higher worm egg counts in males and regularly monitors ram lamb groups.



retrospective application of anaesthesia would be fully compliant with the UK legislation.

Strategies for replacement

Castration

The process of castration can be replaced if farmers are able to manage entire ram lambs as a distinct management group (Case study 2). There is evidence from New Zealand that there are production benefits to leaving males entire (Fisher and others 2010). While the liveweights in this study were matched between entire, cryptorchid and wethered (castrated) male lambs, there were carcass and cost:benefit downsides to leaving males entire.

If farmers decide to manage lambs distinctly, it is recommended that they are separated from females at weaning and that ram lambs are out of sight and sound of cyclic females to reduce the risk of fighting and sexual behaviours.

Tail docking

Replacing the need for removing tails could be achieved using the advancement of genetics and performance recording. It has been demonstrated that while variable, heritability can be as strong as 0.50 to 0.82 in some breeds (such as Finnish landrace); however, selection for tail length is still not that common because of how commonly tail docking is performed (Scobie and O'Connell 2002). Selection of tail length to reduce the need to dock lambs is an opportunity for performance recording breeds (Fig 5) (Case study 3).

Summary

As technology and pharmacology evolve and novel solutions become available, it is essential that, as an industry, we re-evaluate the rhetoric with reference to routine procedures and production systems. It is clear that myiasis and the potential welfare consequence of misalliance need to be avoided, but the prevention of these is multifactorial; where other strategies can be adopted on farm, these alternatives should be sought before routine mutilations are implemented, as is already seen in other sectors, such as the pig industry.

It is essential that as sheep vets we provide credible and deliverable solutions for sheep farmers. We must ensure that they can operate within the law without compromising other aspects of animal welfare, such as the risk of mismothering.

Novel refinement solutions, such as the topical lidocaine, 'Numnuts' systems and chemical castration (anti-GnRH vaccines which reduce testosterone production) may provide plausible strategies for farmers in the future.

The law is clear about permitted time scales during which these procedures can occur, but the diversity of sheep farms may make complete compliance tricky.

Furthermore, Brexit continues to be a pertinent



Fig 5: Given the heritability of tail length, significant advancements can be made in a small number of generations. Currently, very few flocks record tail length predocking, thus limiting our ability to develop estimated breeding values for this trait. This image shows two females from the same flock and the progress that has been made to reduce the tail length and thus the need for tail docking

reminder to UK sheep flocks of their reliance on the EU for lamb export and the need for aligned standards within these member states to allow feasible trading to continue.

Amendments to tail docking and castration requirements should feature on any complete horizon scan for all UK sheep sector advisers, and proactive farmers should question the necessity of performing these mutilation procedures on their flock; farmers should consider the possibility of reducing, refining and replacing these procedures for their sheep where necessary.

Moreover, it is evident that sheep sectors and import/export markets in other European countries can perform sufficiently without the need for either type of mutilation. Therefore, there should be ongoing dialogue about this and the topic should be kept under review for the flocks we advise on within the UK.

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Useful resources

- COMPASSION IN WORLD FARMING: www.ciwf.org.uk/
- NUMNUTS: <https://numnuts.store/about/>
- PEOPLE FOR THE ETHICAL TREATMENT OF ANIMALS: www.peta.org.uk/