

# Best practice guide for pain management in livestock



# Introduction

Pain and inflammation in farm animals are a drain on productivity. Despite our best efforts to prevent disease, there will always be situations on farm where the initiation of pain or inflammation cannot be avoided, such as, diseases and procedures imposed on the animals for management, like castration and tail-docking. However, the prompt or even pre-emptive treatment of these diseases or procedures with appropriate anti-inflammatory or pain relief can reap rewards.

A robust strategy to decrease pain and inflammation must be implemented on farm as part of standard day-to-day operating procedures as a means to improving animal welfare, and improving the economic efficiency of the holding.

Considerations for implementing pain and inflammation management will be discussed in this booklet, to help aid you to formulate and understand the correct plan for your stock and your farm in conjunction with your veterinary surgeon.

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# What is pain?

Pain has two components, physiological and psychological/emotional. Essentially both these respond to a stimulus that is actually or potentially damaging to tissues, causing nerve impulses to fire along pain-specific nerves towards the spinal cord and brain.

This stimulus causes a protective response:

- **Conscious:** attempts to escape or avoid the painful stimulus
- **Unconscious:** withdrawal reflex, cardiovascular response, inflammation

## Psychological/emotional

The conscious perception of the pain, and the longer-term effects that the painful incident has on the animal

e.g. not eating because the animal does not want to walk to the feed trough because walking is painful.



## Physiological

What the animal actually feels as a direct result of a condition, procedure or injury

e.g. foot pain caused by lameness.

# Types of pain

## Acute pain

Acute pain is a protective mechanism that can be defined as ***“the everyday experience of discomfort that occurs in response to a simple insult or injury.”*** Acute pain makes animals notice an injury and move away from the danger that caused the injury; thus, it is generally short-lived.

## Chronic pain

Chronic pain is a persistent kind of pain that may or may not be associated with recent injury, but is generally associated with inflammation and changes to nerve cells in the spinal cord and brain. This **“wind-up”** phenomenon is an increase in sensitisation of excitable nerve cells and thus, something normally mildly painful becomes very painful after repeated insults.

In addition, changes in the spinal cord and brain make pain resistant to treatment with analgesics. This type of pain is common in livestock, for example the chronically lame cow.

# Inflammation

## What is inflammation?

Inflammation is a localised protective response stimulated by injury or destruction of tissues, which serves to destroy, dilute, or wall off both the injurious agent and the injured tissue.

The inflammatory response can be provoked by physical, chemical, and biological agents, including mechanical trauma or infectious agents such as bacteria, viruses, and other pathogenic microorganisms. Although these infectious agents can produce inflammation, infection and inflammation do not always come hand in hand.

The classic signs of inflammation are heat, redness, swelling, pain, and loss of function.

**Figure 1:** Illustration of the process of inflammation through invasion / injury from a foreign object



**A**

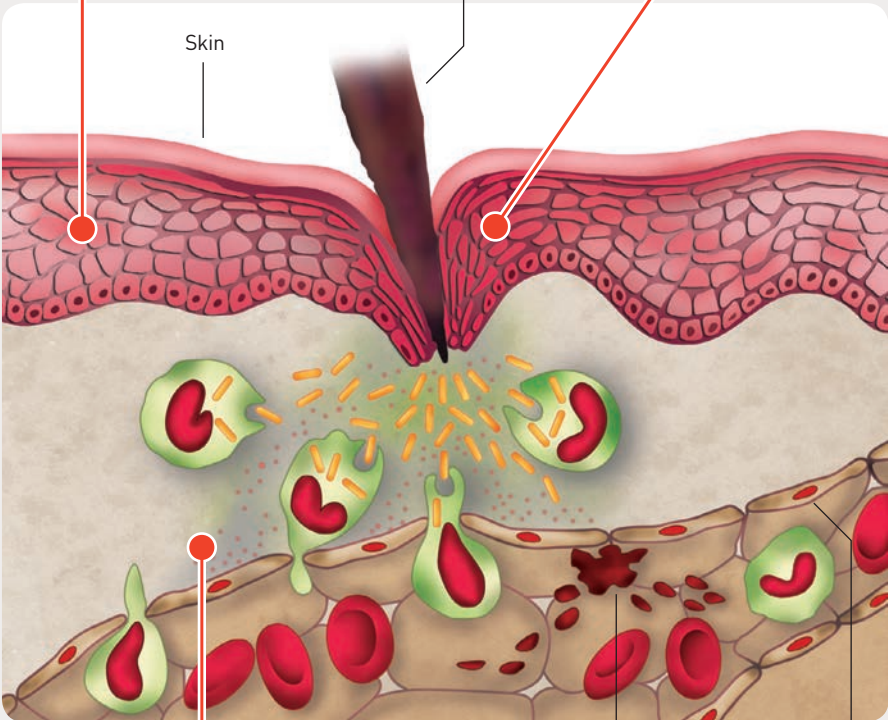
Immune response by damaged cells releases histamine (a protein) which encourages white blood cells to be released from capillaries to fight infection

**C**

Area of injury shows the inflammation as red, swollen and often warm to the touch due to the protective process of inflammation

Object causing injury

Skin



**B**

Bacterial protecting cells (phagocytes) attack bacteria

Platelets for clotting

Capillary wall

# When is pain and inflammation seen in livestock?

Pain or inflammation can occur as a result of diseases present on farm, or as a result of procedures imposed on animals as part of day-to-day farm management.

## Disease processes:

- Lameness
- Mastitis
- Joint/navel ill
- Eye problems: 'silage eye' and 'New Forest eye'
- Downer cows
- Pneumonia
- Metritis

...This list is by no means exhaustive!



Image ref: Mastitis in dairy cattle, Wikipedia

## Management procedures:

- Disbudding/dehorning
- Tail docking
- Castration
- Caesareans/abdominal surgery
- Assisted births



# Signs of pain and inflammation

Animals cannot verbalise when in pain, and therefore the assessment and quantification of pain or inflammation in livestock is difficult.

As already mentioned the cardinal signs of inflammation are heat, redness, swelling, pain and loss of function. However, it is important to consider that sometimes a disease process can be progressing internally. For example with pneumonia the cardinal signs may not be immediately visible; however, research has proven that cattle who suffer pneumonia display behavioural indicators of discomfort and that the lungs undergo massive loss of function as a result of the inflammatory response to infection.

Signs of pain in livestock vary hugely and can range from subtleties such as mild postural changes and inappetance, to recumbency (animals unable to get up) and extreme vocalisation.

## Signs to look out for are:

- Abnormal head position or shaking
- Abnormal ear position or twitching
- Abnormal facial expression
- Vocalisation
- Lameness or difficulty getting up/lying down
- Arched back
- Kicking/rolling/restlessness
- Swelling/bruising/redness/injury
- Dullness
- Tooth-grinding/salivation
- Tail swishing
- Lack of appetite
- Declining body condition
- Decreased productivity  
eg. milk yields, liveweight gain



Image courtesy of NADIS

# Industry initiatives

More research needs to be done to standardise subjective assessment of pain in livestock on farms. Research into the strategy for scoring lameness in dairy cattle is at present the most advanced. AHDB Dairy, in conjunction with the University of Bristol has developed an industry standard scoring system for use on farm. The objective of this is to help benchmark farms (increasingly a compulsory requirement for farm assurance schemes) and for regular scoring to enable animals to be spotted early enough to initiate therapy early enough to improve long-term outcomes. Speak to your vet for more information.

# AHDB

DAIRY



| Category of lameness       | Score | Characteristics of the lameness   | Recommended action   |
|----------------------------|-------|---|--|
| Good mobility              | 0     | Walks with even weight bearing on all four feet and will. Long, fluid strides possible.   | <ul style="list-style-type: none"> <li>No action needed</li> <li>Routine preventative foot trimming when/if required</li> <li>Record lameness or new scoring status.</li> </ul>  |
| Imperfect mobility         | 1     | Some uneven (flexes or weight bearing) on single limb(s); limbs not noticeably coordinated.   | <ul style="list-style-type: none"> <li>Could benefit from routine (preventative) foot trimming</li> <li>Further observation recommended.</li> </ul>  |
| Impaired mobility          | 2     | Uneven weight bearing on significant limb(s) or obviously in one or both limbs with toe drag.   | <ul style="list-style-type: none"> <li>Some may likely to benefit from treatment</li> <li>Foot should be lifted to avoid the risk of lameness before treatment</li> <li>Should be attended to as soon as practically possible.</li> </ul>  |
| Severely impaired mobility | 3     | Unable to walk on foot on a brief limping test (limper limp up with the healthy limb). Some may struggle to identify - limp, and heavily about on landing and walking. Very slow. | <ul style="list-style-type: none"> <li>This cow is very slow and requires close attention, nursing and further</li> <li>Gradualness notice</li> <li>Exercise on soft or suitable</li> <li>Cow will benefit from treatment</li> <li>Cow should not be made to walk for and kept as a show yard for 14 days</li> <li>In the most severe cases, culling may be the only possible option.</li> </ul> |

| AHDB DAIRY Scoring swellings          |   | Head and neck  | Front leg   | Mid leg and hock  | Rear of body  |
|---------------------------------------|---|--|---|---|---|
| Score                                 | No swelling   |  |   |   |   |
| 0                                     | No swelling, or a swelling smaller than 2cm   |  |   |   |   |
| 1                                     | Mild swelling larger than 2cm such that the normal anatomy of the area is enlarged, poorly defined or obscured<br>Lack of definition of joints; 2-5cm swelling on other parts of the body |  |   |   |   |
| 2                                     | Substantial swelling<br>Abnormal enlargement larger than 5cm which is prominent/protrusion extending away from the body<br>May be at least 5cm long, rather than round                    |  |   |   |   |
| Factors which may result in swellings |   | <ul style="list-style-type: none"> <li>Injection sites</li> <li>Incorrect neck rest height - collars and head barrier</li> <li>Protruding items</li> </ul> | <ul style="list-style-type: none"> <li>Cubicle comfort</li> <li>Amount and type of bedding</li> <li>Protruding items</li> </ul> | <ul style="list-style-type: none"> <li>Cubicle comfort</li> <li>Amount and type of bedding</li> </ul> | <ul style="list-style-type: none"> <li>Broken cubicle fittings</li> <li>Protruding/low hanging items in housing or cow flow area</li> </ul> |



# Legal responsibilities

Farm animals are recognised as sentient beings (experiencing sensations or feelings) within the EU Treaty of Amsterdam 1999. There are regulations in place to prevent animals suffering; some are more specific to livestock farmers.

## The Animal Welfare Act 2006:

- It is an offence on the part of the person responsible for an animal to cause or permit it to suffer

## Mutilations (Permitted Procedures) (England) Regulations 2007:

### Cattle

- **Castration**
  - *Anaesthetic must be used in cattle over two months' old*
- **Disbudding/dehorning**
  - *Anaesthetic must be used*
- **Removal of supernumerary teats**
  - *Anaesthetic must be used for cattle over three months' old*

### Pigs

- **Castration**
  - *An anaesthetic and additional prolonged analgesia must be administered where the animal is aged 7 days or over*
- **Tail-docking**
  - *An anaesthetic and additional prolonged analgesia must be administered where the animal is aged 7 days or over.*

## How long does local anaesthetic last for?

30 – 90 minutes. Therefore the addition of a non-steroidal anti-inflammatory drug with longer duration of action should be considered in any procedures considered worthy of local anaesthetic, and more besides!

The **Farm Animal Welfare Council (FAWC)** "Five Freedoms" detail the following as general guidelines to the basic care of farm animals:

- Freedom from **hunger and thirst**
- Freedom from **discomfort**
- Freedom from **pain, injury or disease**
- Freedom to express **normal behaviour**
- Freedom from **fear and distress**

# Economically painful!

The average cost of an incidence of lameness, in terms of treatment costs, loss of yield and potential for earlier culling of the cow is estimated to be up to £350; at current levels of incidence this could equate to a **financial loss of nearly £7,500 for an average-sized herd**, or to put it another way, **a cost of nearly £1 per litre of milk produced on the farm**<sup>1</sup>.

**£350  
PER COW**

It has been shown that there is a **negative correlation between animals' average daily weight gain** and the extent of lung lesions due to BRD<sup>2</sup>, and it is likely that the pathogenesis of the lesions is associated with an excessive inflammatory response<sup>3</sup>.

**Acute E.coli mastitis** is one of the major sources of economic loss in the dairy industry due to **reduced milk production, treatment costs, discarded milk**, and occasional **fatalities**<sup>4</sup>.

Cows with a difficult calving take an **extra 8 days to resume ovarian activity**, are more prone to subsequent abnormal cycles, and thus **take 23 days longer to conceive** than normal herd-mates. If a caesarean operation is required, the consequences for fertility are dire: many farmers cull these animals but if the cows are rebred, **an extra 40 days are required to achieve conception**<sup>5</sup>.

## Treatment of pain/inflammation in livestock

Drugs used in the alleviation or prevention of pain in livestock can be divided into three main categories:

### Non-steroidal anti-inflammatory drugs

- Licensed for specific conditions, eg. mastitis, lameness
- Less side effects
- Long or short duration of action

Examples: Loxicom, Carprieve, Flunixin

### Steroids

- Very potent
- More side effects
- Broadly licensed for general inflammation
- Long or short duration of action

Examples: Colvasone

### Local anaesthetics

- Licensed for use during surgical procedures
  - Very short-acting
- Examples: Adrenacaine

**Which class or classes of drug are most appropriate for your needs must be discussed in conjunction with your veterinary surgeon. Factors to consider in choosing the right drug for your animal may include:**

- Speed of action
- Duration of action
- Potency
- Additional properties e.g. alleviation of pain, reduction of inflammation, anti-endotoxic effect, reduction of temperature

Sometimes, for example during abdominal surgery, your veterinary surgeon may choose to use a combination of classes: for example, local anaesthetic as a skin block and an epidural, as well as a non-steroidal anti-inflammatory. This approach is called 'multi-modal'.

When carrying out procedures on farm, it will always be recommended to administer any of the anti-inflammatory or pain relief therapies in advance of the painful stimulus, rather than after, to help prevent the 'wind up' phenomenon, and decreased sensitivity to the drugs used.

## Small ruminants

None of the above classes of drug are licensed for small ruminants eg. sheep and goats. However, your veterinary surgeon may be able to prescribe these drugs 'off-label' in individual circumstances. 'Off-label' use and appropriate withdrawal periods of any drug must be discussed with your veterinary surgeon.

**The importance of environmental management of animals suffering pain or inflammation will not be negated by the use of drugs. Considerations must also include:**

- Providing comfortable deep beds for animals who are reluctant to stand or cannot stand
- Constant access to food and water in the immediate vicinity
- Regular repositioning of heavy recumbent animals, eg. Downer cows
- Blocks for lame cattle
- Bandaging of wounds where appropriate
- Separation of animals or placing them in smaller groups

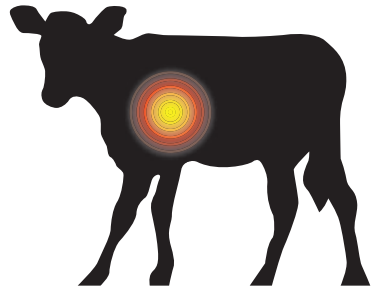
**If pain or inflammation is too severe to be controlled by a combination of drug therapy and environmental management, euthanasia may have to be considered as an appropriate way to alleviate suffering.**

# What evidence do we have to justify the prevention/treatment of pain or inflammation in livestock?

The answer is, a great deal!

## Pneumonia

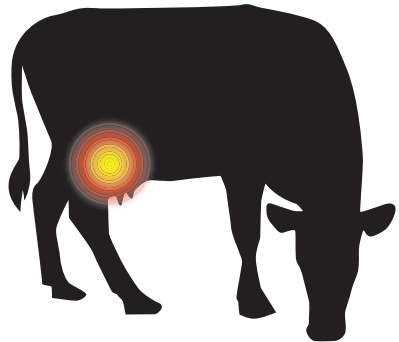
**Non-steroidal anti-inflammatory drugs** have been shown to **reduce temperature** for up to 24 hours<sup>6-9</sup>, improve clinical signs<sup>7-9</sup>, reduce lung pathology<sup>6-9</sup>, and **increase average daily weight gains in calves**<sup>10</sup> with respiratory disease compared to untreated calves or calves treated only with antimicrobial drugs<sup>6</sup>.



## Mastitis

Non-steroidal anti-inflammatories administered to cows with *E. coli* mastitis resulted in:

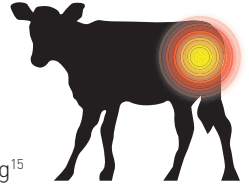
- Reduced temperature post-treatment
- Restored gut motility faster
- Earlier improvement of clinical signs<sup>11</sup>
- Reduced inflammation of the udder<sup>12</sup>
- Higher milk yields after treatment<sup>13</sup>
- Reduced somatic cell counts<sup>14</sup>



## Calf diarrhoea

Animals treated with non-steroidal anti-inflammatory drugs alongside other therapies such as fluid therapy and anti-infectives:

- Start eating and drinking earlier and eating more
- This results in faster bodyweight gain and therefore earlier weaning<sup>15</sup>



## Surgery - before, during and after operations

Administration of non-steroidal anti-inflammatory drugs alongside digit amputation resulted in:

- Decreased stress response
- Decreased lameness score
- Decreased body temperature
- Increased standing time<sup>16</sup>



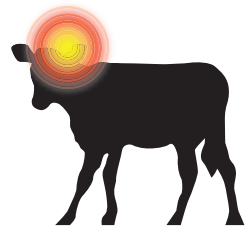
Administration of a non-steroidal anti-inflammatory drug to cattle undergoing Caesarean section resulted in:

- Increased lying time post-op which is believed to be an indicator of comfort getting up and lying down<sup>17</sup>

## Dehorning

Administration of a non-steroidal anti-inflammatory drug at dehorning resulted in:

- Lower stress response<sup>18</sup>
- Less ear-flicking/head-shaking
- Less pain sensitivity<sup>19</sup>
- Quicker weight gain in the 10 days post procedure<sup>20</sup>





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