

# IMPROVING *Foot Health*



Preventing, managing and treating bovine lameness to improve the health, welfare and production.

**Dugdale**  
**Nutrition** 

## Introduction

Foot health and good mobility are essential factors to contribute to good productivity and welfare of cattle. This guide provides the latest information on foot trimming methods, cubicle designs, walking surfaces, footbathing and footbath design. The information follows the series of meeting held on farm which incorporated speakers Dr Nick Bell, Dr Debby Brown, Jonathan Huxtable and Professor Christoph Mülling.

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## Foot Trimming Protocols

When the cow walks, one claw (dynamic claw) hits the ground with force (outside hind claw, inside front claw) and the other claw stabilises the foot (inside hind claw, outside front claw). We have to bear claws in mind when trimming. There are 5 steps to trimming feet:

### Step 1: Correct length, optimise toe angle and create a stable toe triangle

Correct the length

- 7.5cm for B&W heifers and small cows at dry off
- 8cm+ for older cows, cows with claw lesions and fresh cows on abrasive surfaces

Optimise the toe angle to 48-52°.

Create a stable toe triangle for the cow to walk on. Trim excess sole thickness at toe, sparing wall, and heel to create a stable toe triangle.



### Step 2: Balance claws

Trim the dynamic claw so its weight bears evenly from the toe triangle along the length as best as possible.



### Step 3: Model out the centre of the dynamic claw, to reduce the risk of bruising and create slurry clearance

Model deep enough so that the centre sole flexes.

Extend 2/3 across the claw, but do not extend into the toe triangle.



### Step 4: Relieve the weight off a painful claw

If the partner claw is healthy apply a block

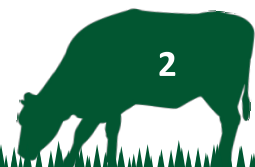
- 2-3 weeks on a dynamic claw
- 3-6 weeks on a stabilising claw
- Give anti-inflammatory/pain relief

Spare heel on a disease stabilising claw.

Trim the heel on a diseased dynamic claw.

### Step 5: Remove loose horn

Remove loose horn carefully with a very sharp knife.



## Lame Cows

### Common Faults

1. **Removing outer walls with the grinder** – the wall is needed as protection and weight bearing.
2. **Grind between the toes** – this increases toe necrosis and makes the wall thinner.
3. **Blunting toes without steepening angle** – need to address sole thickness and toe length to achieve the required angle.
4. **Creating thin soles** – this occurs if the pedal bone moves, if trimmed too thin or if cows walk on new concrete /sand after trimming.
5. **Over-trimming heels** – heels become overgrown in lame cows. Often dynamic claws look unbalanced but in reality they are not.
6. **Under-trimming lame cows** with necrotic lesions because they are trimmed without any local anaesthetic.



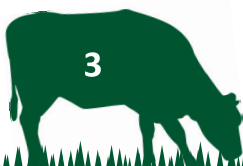
### Lame Cow Behaviour

Lame cows alter the way they move around a building and use cubicles. They stand longer in a cubicle before they lie down as it is more painful for them to stand up again. Some lame cows lie for longer as they are reluctant to stand or lie down. Some have very short lying times and stand in the cubicle but fail to recover. Lame cows often do not eat normally and therefore lose weight.

The status of cows in cubicles should be assessed 1-2 hours after milking. If more than 20% of cows in a cubicle are standing at one time this gives an indication of a herd lameness issue.

To help lame cows we need to:

- Identify lame cows as soon as possible
- Move lame cows to clean pasture or well-bedded area until treated
- Keep lame cows off cubicles after treatment until they are walking better



## Walking Surfaces & Cubicle Alleys

Walking surfaces can be responsible for:

1. Trauma
2. Slipping
3. Excessive hoof wear
4. Concussion

### 1. Trauma

Trauma occurs due to rough surfaces on walkways, cubicle alleys and tracks to grazing.

### 2. Slipping

Slipping increases the force across the white line and increases the risk of white line separation. The risk is higher in places with smooth, slippery surfaces where the cow is put under pressure or has to turn sharply.

### 3. Excessive Hoof Wear

Excess hoof wear occurs where cows are spending long times walking or stood on concrete and rough surfaces.

Slopes greater than 2% increase the risk of excessive hoof wear.

### 4. Concussion

Concussion is increased when walking and standing on concrete and makes a lame cow worse.

Rubber flooring at pinch points will help with these issues.

### Cubicle alleys

Grooving is important to help reduce slipping but many grooves are done too narrow, shallow or the wrong distance apart. Each hoof should be in contact with at least one groove. Manure will be pushed along the groove as the sole touches the concrete.

Groove alleys parallel to the feed trough should be 0.75" wide, 0.5" deep and every 3-3.25" apart. For crossovers or other turning points, groove a diamond pattern with a diagonal groove of 0.75" wide and 0.5" deep with 4-5" at the centre. The edges should be vertical.



Grooved floors reduce the risk of slipping and rubber matting helps reduce concussion



## Cubicles

The cubicle should be designed to make the cow able to lie down and more importantly, stand easily. Comfort is crucial to ensure maximum lying times.

We need to look at:

1. Surface cushion and traction
2. Resting area to allow normal rising movements
3. Room to lunge and bob the head
4. Room to rise below and behind the head rail

### 1. Surface Cushion & Traction

Sand is the gold standard surface with a deep bed providing cushioning, allowing long lying times, reduces hock abrasions and gives traction when standing.

The bedding must be well maintained to ensure an even fill level to the rear curb and within 10cm of the top of the brisket locator. Remove wet sand at each milking and level at least 3 times per week.

Mattresses can be improved by using more bedding or adding a foam layer under the top cover.

### 2. Resting Area

The resting area is defined by the dividers. For Holsteins the width should be:

- 46 -48" (116 to 122 cm) for 1st lactation heifers
- 50" (127 cm) for mature cows
- 54" (137 cm) for dry cows

The wider cubicles allow the cow to lie short and wide without disturbance from the next cow.

Narrow cubicles reduce lying and make it harder for lame cows to get up and lie down.

The brisket locator determines the lying position of the cow. This locator should be no higher than 10cm (4") above the cubicle surface to enable the cow to take a forward stride when she stands up.

If there are issues with the cubicle design the cows will lie diagonally. The reasons will be either mechanical or social obstruction. If there is something in the way of the lunge or bob movement of the cow then the cow will begin to lunge sideways. Obstructions can include a wall, a bar or a wire less than 36" above the cubicle surface or a high brisket locator. Social obstruction is where cows interfere with each others space, often when cubicles are too short.

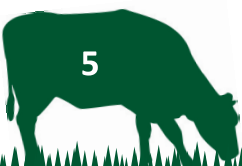
### 3. Lunge and Bob

Cows require 3' (91 cm) lunging space to allow them to balance on their knees as they bob forward to take the weight off their hind legs when standing. To allow side lunging when cubicles are too short, the lower divider rail must be no higher than 12" above the cubicle. There should be 5" between the brisket locator and the lower divider rail to allow the step forward.

### 4. Head Rail

The neck rail location has an effect on standing but not lying. If too close to the rear curb it will increase perching on the back of the cubicle. If a mattress cubicle, the neck rail should be above or in front of the brisket locator.

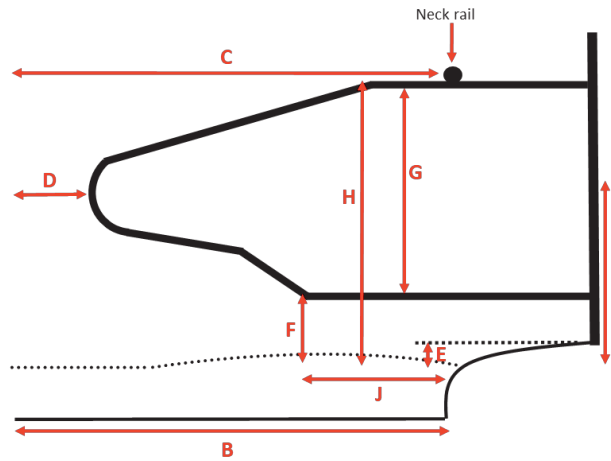
Curbs should ideally be 8-9" in height. Higher curbs can make it harder for heifers and lame cows to back out of the cubicle. Making the cubicle wider, more cushioned and moving the neck rail forward will reduce perching even with high curbs.



## Cubicle Dimensions

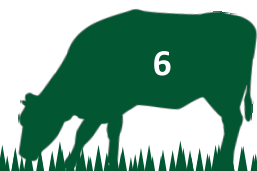


Rear view of cubicles



Side view of cubicles

Cubicle Dimension Guidelines (inches)	Body Weight Estimate (kg)	
	640	730
Cubicle width (A)	48	50
Cubicle length single	108	120
Cubicle length double	96	102
Outside curb to outside curb distance for head-to-head platform	192	204
Rear curb to brisket locator (B)	68	70
Rear curb width (loose bedded cubicles)	6-8	6-8
Horizontal distance between rear edge of neck rail and rear curb for mattress cubicles (C)	68	70
Horizontal distance between rear edge of neck rail and rear curb for sand and compost cubicles (C)	62	64
Distance from rear edge of divider loop to point of curb (D)	9	9
Height of brisket locator above cubicle surface (E)	4	4
Height of upper edge of bottom divider rail above cubicle surface (F)	12	12
Interior diameter of the cubicle divider loop (G)	33	36
Height below neck rail (H)	48	50
Obstruction height (I)	5-35	5-35
Horizontal distance from brisket locator to loop angle (J)	20-22	20-22
Rear curb height (K)	8	8



## Footbaths & Hygiene

### Footbaths

Footbaths are used to prevent chronic lesions returning to active lesions and are important in the control of infectious feed lesions. Farmers are all different in the requirement for footbaths. The better the hygiene, the cleaner the cows' legs and feet, the lower the frequency footbaths are required.

Footbath design is crucial for success. There must be at least 2 'dunks' of the back feet and this means the footbath must be at least 12 foot long. This can increase the volume and so making the footbath narrower can help. An instep of 10" helps retain the solution and the solution depth should be at least 4" (10cm).

### To find the capacity of the footbath we need:

Length (m) X width (m) X depth (m)  
= number of litres= kg of water

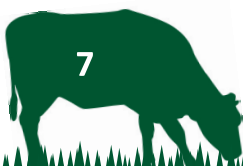
### To calculate chemical:

kg of water X % solution desired  
= kg chemical to add

If the side walls of the footbath are sloped a width of 2 foot (60cm) will work.



Footbath dimensions





## Digital Dermatitis

### Digital Dermatitis

Lameness is a constant drain on performance and margins, reducing yields and impacting on performance. In this booklet we have looked at trimming of cows feet, housing and footbathing,

Good hygiene is also a major tactic in the fight against digital dermatitis as Dr Christoph Mulling, Professor of Veterinary Anatomy at the University of Leipzig explained at our meetings in September. He said that 90% of farms will be affected by the disease and reducing the incidence is a balance between the bacteria, maintaining skin condition and hygiene.

The cow has three levels of protection in the foot. The first is the horn which is made up of dead epidermal cells which are bonded together with a biological glue, rather like the mortar in a brick wall. The living protection are the epidermis and dermis.

The epidermis, which is the barrier to infection is only 0.3mm thick. If it is intact, there is no way bacteria can penetrate. Problems only occur when the epidermis is compromised.

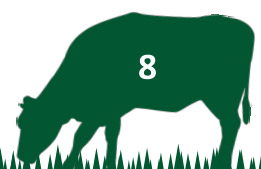
As soon as the bacteria get through the epidermis, an immune response is triggered leading to inflammation, pain and the physical symptoms and consequences of lameness. Manure, urea and water can all progressively

disrupt the skin by weakening the bioglue in the horn allowing bacteria to enter. It is therefore vital to do all you can to keep conditions as clean and dry as possible.

There are two manifestations of digital dermatitis. Acute lesions are the well-recognised classic strawberry shape which migrate into the claw. Chronic lesions reside deep in the foot and can convert to acute lesions at any time.

Animals with acute infections need to be treated quickly, ideally with preventative trimming and the use of an oxytetracycline spray after the foot has been cleaned and dried. Bandaging the foot will allow the wound to heal, but only leave the bandage on for 24 hours. Check the foot a week after treatment and treat again if needs be.

Do not put cows with an open wound through a formalin footbath as it hurts and does no good. However, at a herd level footbathing is an effective way to reduce the bacterial load which is a key component of any prevention strategy.



## Minerals from Dugdale Nutrition

At Dugdale Nutrition, we now have a range of minerals to suit everyone.

### DN iFeed Essential Minerals

Minerals using inorganic salts to meet standard requirements for suckler cows including a high level of magnesium for grazing cattle at risk of grass staggers, dairy cows and general purpose minerals.

### DN iFeed Progressive Minerals

Minerals of a specification shown to improve performance of ruminants on farm, including Availa formulations

The range includes a Dry Cow Mineral, a Lactating Cow Mineral, an Intensive Beef Mineral and a Heifer Mineral with the Digital Dermatitis formula.

Our Progressive Mineral range all include Availa minerals which are proven to be more readily absorbed and utilised by the cow to ensure optimal results.

Over 60 research papers have shown the benefits to include lameness reduction, improved immunity and lower SCC, improved fertility, increased milk production, better feed efficiency and digital dermatitis control.

Our Progressive Heifer mineral contains the Availa Plus formula which, if fed prior to signs of digital dermatitis occurring, will reduce the risk of this disease and provide protection through into lactation.

## Bespoke minerals

Minerals designed to suit your own farm following a full mineral audit. To develop these, we will analyse forages, water (if required), other feed inputs and all supplements used.

We will highlight any excess or deficiencies and can then specify a mineral that would suit your individual farm. If the minerals are purchased from us there will be no cost to this service.

### iFeed 'Essential' Minerals

Dry Cow Essential 25kg

GP Essential 25kg

Dairy Essential 25 kg

### iFeed 'Progressive' Minerals

Progressive Dry Cow 25kg

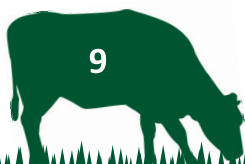
Progressive Dairy 25kg

Progressive Beef 25kg

Progressive Heifer 25kg

### Benefits of Zinpro Availa 4 Include

1. Increased Milk Production
2. Better Production
3. Improved Hoof Health
4. Improved Udder Health



## My Farm Recommendations

This booklet provides information and guidelines for foot trimming, walking surfaces, cubicle dimensions, footbaths, hygiene and digital dermatitis. Your local DN Sales Specialist can provide further guidance and set personal targets for your herd to improve in managing foot health.

Your 3 target areas:

- .....  
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For further information regarding any of our products or guidance on foot health, please contact you local DN Sales Specialist or alternatively get in touch using the details below.

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