TECHNICAL NOTE TN750 / September 2021

SRUC

White Line Disease

Summary

- **White line disease (WLD) is a common cause of lameness in dairy cows, usually affecting the lateral hind claws.**
- **There are thought to be many environmental and management risk factors for WLD but the extent of their risk and interactions are not fully understood.**
- **Prevention and management can be successful however, with key areas to focus on being improving cow comfort and increasing lying times, type of flooring, condition of cow tracks, nutrition and optimising cow flow.**

What is the White Line?

The white line is the area on the sole of the hoof where the wall horn meets the sole horn. The horn in this area is weaker and therefore more prone to damage, particularly from shearing (sideways) forces on the foot. Sudden movements particularly on turning, such as a cow escaping from being bullied or slipping are examples of these shearing forces.

Figure 1. White line separation

How Does WLD Form?

A breakdown and resultant damage to the horn in the white line area makes it easier for slurry, soil and stones to weaken and penetrate the white line. This white line separation can be a cause of lameness, often seen as a darker area tracking into the white line tissue (figure 1).

SAC CONSULTING

471259LH 16.09.2021

Penetration by foreign material through to the corium (sensitive tissue) that underlies the white line can initiate a local bacterial infection. The pus that can form as a result of these infections can dramatically increase pressure within an enclosed space causing severe and usually a sudden onset of lameness (figure 2).

Figure 2. Pus from bacterial infection in the white line area

If untreated the purulent material can either track up the wall to burst out at the coronary band or at the bulbs of the heel. This third stage of the disease process should be avoidable if prompt detection, early and effective treatment is practiced as a standard approach to all lameness cases on farm.

Risk Factors for WLD

Potential risk factors for the disease include the following:

- **Poor cow flow and handling of cows, causing them to abruptly turn and change direction.**
- **Stoney and muddy underfoot conditions, particularly in grazing cattle at the beginning and end of the grazing season.**
- **Roughened underfoot conditions in the housed environment, such as excessive grooving.**
- **High stocking densities, resulting in poor cow flow and more cow-to-cow negative interactions. Collecting yards with backing gates can be one specific area to consider.**
- **Sole thinning as a result of increased wear can cause the sole to flex more with resultant damage to the white line structure.**
- **Nutritional influences on horn quality, particularly biotin deficiency.**

Prevention

Preventing WLD involves a number of factors relating to managing the housing environment, cow comfort, cow flow and nutrition:

- **Reduce standing times and increase lying times.** The longer cows stand on concrete for the greater the risk of white line damage. Try to minimise standing times in the collecting yard for milking (no more than one hour away from feed/cubicles per milking) and look at cow comfort such as cubicle design, lying surface and bedding provision. Stocking density could also be a contributing factor: have sufficient cubicles, ideally 5% more than the number of cows. The target is for cows to be lying for a minimum 12 hours/day.
- **Management of cow tracks.** For grazing herds, the state of cow tracks is important as stoney tracks will greatly increase white line penetration. Consider upgrading cow tracks with astroturf. Cow tracks should be free-draining, free from stones and used only by cows (no machinery). Pay particular attention to gateways and areas around water troughs.
- **Nutrition.** Inclusion of biotin in the diet at 20mg/cow/day has been shown to reduce the incidence of WLD by as much as 50%. However, this is a long-term strategy and due to the time taken for new horn growth, improvements may take six months to be seen.

- **Cow flow.** Is really important to reduce pushing, turning and twisting forces on the hooves. This includes gentle herding of cows both at grass and when housed and adapting housing to try and reduce stocking density, open up cross passages and blind alleys if possible. When bringing cows to the parlour, particularly from grass, give cows time and space to adjust from their walking order to milking order (which will be different). Avoid misuse of the backing gate and having to leave the parlour to collect cows into the parlour. If cows are too tightly packed, their heads go up and they cannot see where they are placing their feet, increasing the risk of shearing forces on the white line causing damage.

- **Flooring.** Use of rubber matting at high traffic areas and at tight turns such as exits from the parlour can help to reduce turning forces on the feet. Walking surfaces inside buildings should be non-slip and as clean and dry as possible. Grooving concrete (but not excessively) may help, as well as allowing pasture access or even a loafing area outside for housed cows.

- **Heifers.** Train heifers to use cubicles prior to joining the milking herd. As they are unlikely to have their feet inspected or trimmed during the rearing period, their feet should be inspected and trimmed as necessary once established in the herd.

Monitoring and Treatment

Prompt detection, early and effective treatment is central to any lameness control strategy. Regular mobility scoring carried out by a ROMS (Register of Mobility Scorers) accredited scorer is needed to pick up potential cases very early. Quarterly scoring as required by many milk buyers is not enough for early detection and treatment of lame cows and ideally mobility scoring should be carried out every two weeks.

It is important that members of the farm team carrying out foot trimming have received suitable training and that foot trimmers employed by the farm are trained and are accredited members of one of the national UK foot trimmer organisations. It is also essential to understand your limitations with foot trimming ability and when a case needs to be examined by your vet.

Uncomplicated cases of white line separation can be treated using the Dutch 5-step foot trimming method, with any under-run or loose wall horn removed as part of step 5.
https://ahdb.org.uk/knowledge-library/trimming-cows-feet-the-five-step-dutch-method

White line abscesses require draining with sufficient horn removed to ensure that the hole remains open to drain following treatment.

More complicated cases where infection has tracked up the wall or deeper into sensitive tissues require veterinary treatment.

For all of the types of WLD described above a block should be applied to the healthy claw to aid with pain relief and recovery. In addition, all cases should receive non-steroidal anti-inflammatory therapy prescribed by your veterinary surgeon.

All lameness cases should be reviewed following treatment to be sure that the expected recovery has been achieved and if not, further veterinary advice should be sought. All cases should be recorded by cow number, date, affected hoof, type of lameness and treatment.

Consideration of the main causes of lameness for your herd, the relevant herd risk factors and control strategies are best achieved through the AHDB Dairy healthy feet programme and network of mobility mentors.
https://ahdb.org.uk/healthy-feet-programme

Authors

Colin Mason
SRUC Veterinary Centre Manager, SRUC Disease Surveillance Centre, St Mary's Industrial Estate, Dumfries, DG1 1DX / Tel: 01387 267260

Lorna MacPherson
Dairy Consultant, SAC Consulting, Ferguson Building, Craibstone Estate, Bucksburn, Aberdeen, AB21 9YA / Tel: 01467 530445

Acknowledgement

This Technical Note has been produced as part of work funded by the Universities Innovation Fund from the Scottish Funding Council.