

# The importance of hoof health in dairy cows

## 1 Introduction

Lameness is a clinical sign related to hoof lesions, and other locomotor system problems. It manifests as abnormal postures and/or movements. Hoof lesions can have an impact on the welfare and health of the animals, as well as the economy of the farm.

## 2 Methodology

The sources used for the preparation of this bibliographic review were: scientific and magazine articles, books, and websites. Databases such as UAB online library, Science Direct, Journal of Dairy Science, SPAC and Google Academics were used.

## 3 Objectives

- Deepen the knowledge of lameness in dairy cows, approaching it from the perspective of the sector in Catalonia and Spain.
- Review the available scientific literature as well as gather information from experts in bovine podiatry and from associations dedicated to hoof health.

## 4 Results

**Table 1.** Prevalence of lesions in the annual report of 2023 from CONAFE's hoof health program I-SAP.

	Name	Prevalence Catalonia	Prevalence CONAFE
Infectious Lesions	Digital Dermatitis	10,41%	14,06%
	Interdigital Phlegmon	2,16%	1,94%
	Other	1,51%	1,33%
	Total of Lesions	14,08%	17,33%
Non Infectious Lesions	White Line Disease	12,38%	13,73%
	Sole Ulcer	5,18%	10,72%
	Other	4,24%	7,86%
	Total of Lesions	21,8%	32,31%



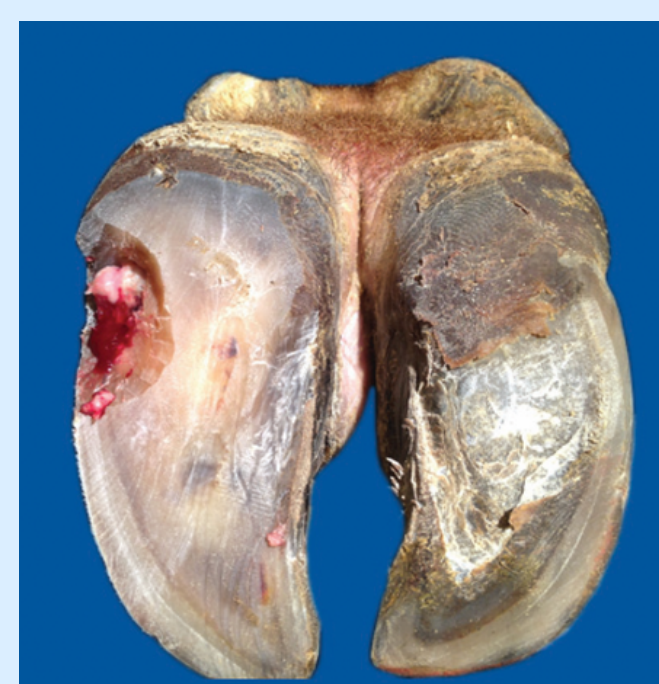
**Figure A. Digital Dermatitis**

Infectious disease of the skin, normally contained in the heel of the hoof. Caused by bacteria such as *Treponema spp*, which use previous irritative lesions of the skin to proliferate. It has five different stages, leading from an acute lesion to a chronic proliferative stage.



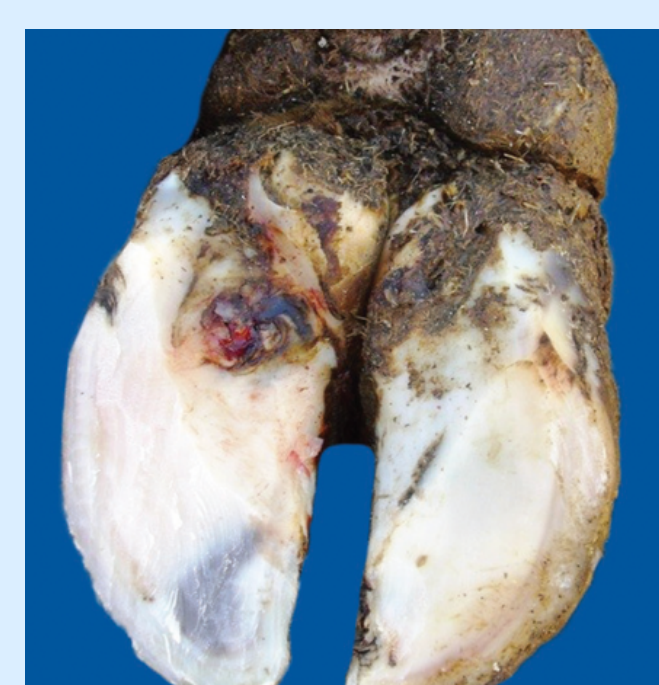
**Figure B. Interdigital Phlegmon**

It's an infectious disease originating in the interdigital space of the hoof. It has a fast onset where pus can be seen, and it presents a characteristic smell. It's caused by anaerobic bacteria like *Fusobacterium necrophorum*, *Prevotella intermedia*, *Trueperella pyogenes*, and others.



**Figure C. White Line Disease**

They're a group of lesions like hemorrhages, fissures, and abscesses that are localized in the white line area of the hoof. It's a weak area where two types of hoof growth meet, so any traumatic lesion will easily develop a lesion.



**Figure D. Sole Ulcer**

They are areas where the corion protrudes because of increased pressure. There's a change in the structures that participate in the weight-bearing functions; the distal phalanx (P3) compresses the corion, causing a hemorrhage and the following ulcerous lesion. It can appear fresh and reddish or necrotic and brownish.

The economic importance resides in the treatment costs and the productive, reproductive, and culling losses caused by the lesions.

There are different factors that can increase the probability of a cow being lame, such as:

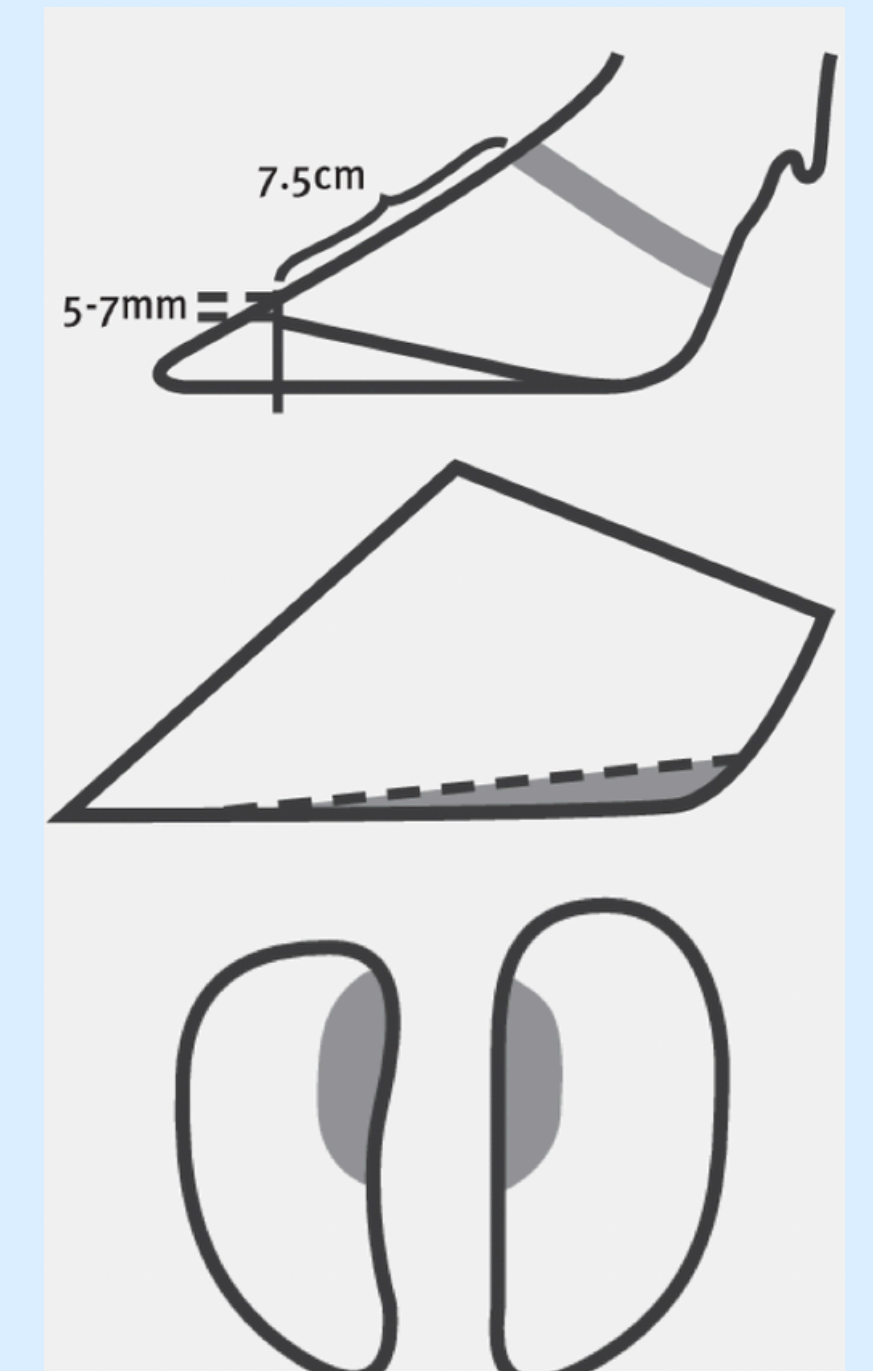
- Animal-related: hoof anatomy, recurrence, BCS, milk production.
- Housing: bedding materials and depth, cubicle width.
- Environment: cleanliness.

Locomotion scoring methods or gait score predictors were developed in order to obtain an early diagnosis and start treatment before the lesion becomes chronic. They're usually based on visual observation, and different locomotion traits are scored. RoMS (Register of Mobility Score) is an example of a predictor that sorts cows into four categories:

- RoMS**
- 0: cow with normal mobility
  - 1: mildly lame cow
  - 2: moderately lame cow
  - 3: severely lame cow

In case of infectious hoof lesions, prevention is best achieved with the use of foot baths.

On the other hand, with non-infectious lesions the best prevention is hoof trimming. It should be done twice a year, and experts in podiatry usually follow the 5-step Toussaint Raven method (Figure E).



**Figure E.** Steps 1-3 of the Toussaint Raven hoof trimming method.

## 5 Conclusions

It's crucial to have an early diagnosis in order to prevent further economic costs and losses, and to ensure animal welfare. This can be done by using locomotion scoring methods. Nowadays, these methods are based on visual

observation but we can expect that in the future cameras, algorithms and even AI could be used as lameness detection methods. Prevention is essential for the management of any disease, in the case of hoof lesions it can be done by using foot baths and hoof trimming.

## 6 References

