

# **KERATOMA IN HORSES: RETROSPECTIVE STUDY ON 32 CASES EXAMINED AT CIRALE BETWEEN 2010-2017 AND 2021-2022**

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## **ABSTRACT:**

Keratoma is an excessive and disorganized formation of keratin in the stratum internum of the hoof wall, which can cause foot pain by compressing the sensitive laminae. The main objectives of our study were to describe the population of affected horses in France, identify potential risk factors that could help veterinarians suspect or even diagnose keratoma early, and highlight prognostic factors regarding the horse's future sporting performance. The results showed that affected horses were presented for consultation due to a deterioration in locomotion or lameness, either permanent or intermittent (50%). A majority of these horses had a lameness grade higher than 1.5/5. Additionally, nearly all keratomas were located in the forelimb (89%) and predominantly in the toe area (68%). Furthermore, most horses presented with a physical hoof abnormality (88%), which could be a direct consequence of the keratoma, such as a white line defect (25%). Some horses (37%) also had a secondary lesion on the same limb as the keratoma, but with a secondary clinical significance (60%). Regarding imaging investigations, most keratomas were visible on radiographs with osteolysis of the solar border of the distal phalanx (74%), and half of the horses (48%) showed bone edema on MRI. Finally, half of the studied population (44%) returned to a competition level equal to or higher than before the consultation. In terms of sports prognosis, the study found that the presence of osteolysis on radiography did not negatively impact the horse's sports prognosis. However, the study could not account for the effect of treatment type (surgical excision or not) on the sports prognosis.

## **OBJECTIVES:**

The objectives of this study were to identify potential risk factors or warning signs during the physical, dynamic, or additional examinations of the hoof to enable early diagnosis of keratoma by veterinarians. Additionally, the study aimed to explore the variation in sports prognosis based on different criteria to allow veterinarians to give advice on the future use of the horse.

## **MATERIAL:**

All individuals were selected from CIRALE's computerized archive system, by searching for horses diagnosed with at least one keratoma during consultation or who had a

follow-up on the evolution of this keratoma, over two periods: January 2010 to December 2017, and January 2021 to February 2022. Thus, thirty-two individuals met the study criteria.

The information collected included the anamnesis, history, clinical examination results, as well as all additional tests performed, a description of the lesions identified during imaging, and the conclusion of the observed lesions by order of importance.

The collected data included:

- Age at the time of consultation at CIRALE
- Breed
- Sex
- Body condition at the time of consultation at CIRALE
- Discipline
- Reason for consultation
- Physical examination of the hoof
- Performance of a diagnostic nerve block
- Presence of lameness and affected limb
- Lameness grade (0 to 5)
- Lesion report following imaging tests (radiographs and MRI)
- Limb(s) affected by at least one keratoma

In addition, to specify treatments undertaken following diagnosis, a questionnaire was sent via email to the referring veterinarians, asking them to respond with the following information:

- Was the horse operated on? If so, was the surgery performed while standing or under general anesthesia?
- Did the horse experience a recurrence after excision?
- How long was the horse confined to the stall?

Finally, to evaluate the horses' sports prognosis, information was collected from various websites: FFE (French Equestrian Federation), Le TROT (SECF), and France GALOP, to record the performances achieved after the consultation at CIRALE.

## METHOD:

The description of the studied population and the quantitative variables were described using medians with their dispersion parameters (25th-75th percentiles). Qualitative variables were described as percentages with their 95% confidence interval (CI).

The horses were classified into two groups based on their sports prognosis after keratoma diagnosis:

- **Group A:** Favorable or somewhat favorable sports prognosis; this group included horses that returned to competition after the diagnosis of keratoma, at a level lower, equal, or higher than their pre-consultation level at CIRALE.

- **Group B:** Unfavorable (retirement) or unknown sports prognosis; this group included horses retired after consultation as well as horses that had not competed or had stopped competing at least one year before the consultation at CIRALE and had not returned to competition afterward.

Keratoma characteristics, radiographic signs, and concomitant lesions were compared between the two groups using univariate analysis with Fisher's exact tests. A p-value < 0.05 was considered significant.

## RESULTS:

The results showed that horses with keratoma were mainly presented at CIRALE for deteriorating locomotion or permanent or intermittent lameness (50%). In fact, 56% of the population showed lameness in the hoof affected by the keratoma, with 53% having lameness strictly greater than a grade of 1.5/5. Additionally, 89% of these keratomas were located in a forelimb and 68% in the toe, confirmed by MRI. These results are consistent with the literature, such as articles by Honnas (1997), Redding and O'Grady (2012), and Castelijns (2013). Furthermore, 88% of the horses presented a physical hoof abnormality, with 25% showing a white line defect, a direct visible sign of the presence of a keratoma. Results from additional examinations revealed that 74% of the study's keratomas could be suspected on radiographs due to osteolysis of P3. A concomitant lesion on the hoof was present in 37% of cases, considered clinically insignificant in 60% of them. When MRI was performed, bone edema of P3 near the keratoma was present in 48% of individuals. Concerning the return to competition, 44% of the study population returned to competition at a level equal to or higher than their pre-diagnosis level, regardless of the management method, as the study could not account for the type of post-diagnosis treatment. However, it has been shown by Bosch et al. (2004) that the sports prognosis is better for horses that had keratoma removal than for those who

did not. It could be interesting to conduct a similar study but with a focus on differentiating the population based on the type of treatment administered.

#### DISCUSSION:

The only curative treatment for keratoma is complete lesion excision. It may be useful for horse owners to conduct the same study while differentiating the population based on whether the individuals underwent surgery following diagnosis. This would help horse owners make informed surgical decisions by knowing the sports prognosis based on parameters such as the presence of a lesion concomitant with the keratoma. Studies on post-surgery sports prognosis have compared the prognosis following surgery with conservative treatment, and the type of surgery (complete or partial hoof wall resection). However, to my knowledge, no similar study has aimed to highlight factors for the success of surgery or conservative treatment as we sought to do in this study.

#### CONCLUSION:

The study revealed that the presence of osteolysis on radiographs did not have a negative impact on the sports prognosis, which, as far as I know, had never been demonstrated in previous publications.