The effect of claw trimming on the severity and occurrence of lameness in goats

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Abstract

Claw disorders are a significant welfare and health issue in dairy goats, often leading to lameness, reduced performance, and economic losses. This study investigates the effect of a single claw trimming event on the incidence and severity of lameness in dairy goats across four farms in the Netherlands. Lameness was assessed using a 4-point locomotion score in 308 goats, scored one day before trimming, and one- and two-weeks post-trimming. Results showed variability between farms, with some experiencing increased lameness after trimming while others showed significant reduction or no significant change. Severe lameness did not increase significantly across any farm. The variability in outcomes may be attributed to differences in trimming techniques, farm management, and pre-existing claw conditions. The findings suggest that claw trimming primarily affects mild lameness and highlight the need for optimized trimming practices. Further research is needed to investigate the relationship between pre-trimming claw health and post-trimming lameness.

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Introduction

One of the biggest welfare and health issues in dairy goat farming are problems with the claws. Overgrown and deformed claws are the primary problems and can affect up to 96% of the herd (Ajuda et al., 2019). The main causes for overgrowth and deformation appears to be the use of straw bedding in pens and the lack of exercise. These causes lead to reduction of horn wear (Smith & Sherman, 2009). Because straw bedding is used in almost all dairy goat farms in The Netherlands, this is a major problem among dairy goat farms. Due to the overgrowing of the claws, the locomotion of goats can be affected as well as muscles and skeletal structure. Because of this, there is a higher risk of injury and the risk of infectious agents penetrating increases as well (Somers et al., 2005). If this problem persists, a possible result is that goats might place their bones and joints incorrectly during walking which can lead to chronically deformed limbs (Ajuda et al., 2019). The lameness resulting from these deformed limbs can lead to financial losses due to treatment, decreased milk yield, fertility, and premature culling (Christodoulopoulos, 2009; Hill et al., 1997). According to research, only regular and frequent claw trimming can prevent these problems and trimming regularly is associated with a low lameness prevalence (Anzuino et al., 2010; Muri et al., 2013; Prado et al., 2022). However, other research shows that even though goats are trimmed several times a year the prevalence of overgrowth can still be high (Sailer et al., 2021). Although regular claw trimming is generally associated with preventing overgrowth and reducing lameness, some studies (such as Sailer et al., 2021) indicate that even with frequent trimming, overgrowth still occurs, and the prevalence of lameness remains high. This suggests that trimming might not be a perfect solution and could, in certain circumstances, contribute to the problem. This study is designed to investigate whether claw trimming itself may contribute to the development of lameness in goats.

The aim of this study was to investigate the effect of a single claw trimming event on the severity and incidence of lameness over the course of two consecutive weeks.

Material and methods

Study design

All farms involved in the study were located in the Netherlands and were selected based on the presence of a rapid-exit milking parlor. To ensure accurate lameness scoring, each farm's milking parlor was required to be at least ten meters from the pen, allowing for sufficient observation distance. Lameness in the selected goats was assessed on three occasions: one day prior to claw trimming (first visit), approximately one week post-trimming (second visit, ±1 day), and two weeks post-trimming (third visit, ±1 day).

Farms

Table 1: Farms visited, Herd size, breed, housing and # of trimming per year for each farm

FARM	HERD SIZE	BREED	HOUSING	# OF TRIMMINGS PER YEAR
A	720	Saanen	Straw bedding with deep litter	2
B	1200	Saanen	Straw bedding with deep litter	2
C	620	Saanen	Straw bedding with deep litter	2
D	540	Saanen, over the last years some crossbreeding with Nubian and Alpine goats was performed	Straw bedding with deep litter	2

Selection of goats

On each farm 10% of the goats were selected by selecting every tenth goat that entered the milking parlor. The number of goats selected was 72 (A), 120 (B), 62 (C), and 54 (D). The selection of goats happened inside the milking parlor using an ear tag reader to identify the animals. Each selected goat was assigned an identification number according to their selection order. This number was then marked on the back of the selected goats to enable individual tracking.

Lameness scoring

To assess the effect of claw trimming on the incidence and severity of lameness, the locomotion of selected goats was evaluated using a 4-point scoring system, as described by Anzuino et al. (2010) Table 2). Lameness scoring was conducted as the goats exited the milking parlor, where their gait was observed at a slow pace on a concrete surface. Each selected goat was marked with a number on its back, which was recorded alongside its locomotion score. This number was subsequently linked to the goat's identification tag, allowing for individual follow-up throughout the study. Two investigators were responsible for the selection and scoring of goats on each farm. To minimize potential bias, each investigator consistently performed the same task across all farms.

Table 2: 4-point lameness score used by Anzuino et al., 2010.

Lameness score	Description
Score 0	Goat places full weight on all four limbs, moves forward freely with an even gait
Score 1	Goat has a definite limp on one or more legs, but bearing weight and moves forward freely
Score 2	Goat has some difficulty moving forward, severe limp, bearing little weight on one or more legs, may be a degree of goose-stepping
Score 3	Goat has some difficulty moving forward, not bearing weight on one or more legs, or may ‘goose-step’ high or walk on the knees

Data analysis

The collected data were analyzed on a per-farm basis and divided into three comparisons: the first and second visits, the second and third visits, and the first and third visits. For each comparison, the data for each goat were categorized into three possible outcomes: improvement, worsening, or equal lameness.

Locomotion scores were classified into three levels: no lameness (score = 0), mild lameness (score = 1), and severe lameness (score > 1). To assess changes in lameness over time, a logistic regression model, accounting for random goat effects, was applied. Odds ratios with 95% confidence intervals were calculated using R (version 2023-524) to quantify the effect of claw trimming on lameness progression per farm.

Results

The results from the initial comparison (Table 3) revealed that the impact of a single claw trimming event varied significantly across farms. While there were similarities, such as a comparable percentage of goats showing no change in lameness between the first and second visits, notable differences were observed across farms. For instance, Farm A exhibited a higher percentage of goats with improved lameness compared to those that worsened between one day before and one week after trimming. In contrast, Farm D showed a higher percentage of goats with worsened lameness rather than improvement. Overall, between the first and second visits, three out of four farms experienced a higher percentage of goats with worsened lameness. However, when comparing the second visit (one week after trimming) to the third visit (two weeks after trimming), only Farm D demonstrated a greater proportion of goats that improved rather than worsened or remained unchanged. When considering the entire study period (from one day before trimming to two weeks after trimming), the progression of lameness was inconsistent across farms.

Table 3: lameness comparison between first, second and third visit for each farm visited

			1st visit vs 2nd visit				2nd visit vs 3rd visit				1st visit vs 3rd visit		
Farm	# of goats		improved	worse	equal		improved	worse	equal		improved	worse	equal
Farm A	72		34.72%	19.44%	45.83%		18.06%	22.22%	59.72%		20.83%	43.06%	36.11%
Farm B	120		22.69%	27.73%	42.86%		15.97%	28.57%	48.74%		16.81%	36.13%	46.22%
Farm C	62		16.13%	25.81%	56.45%		24.19%	14.52%	58.06%		24.19%	24.19%	48.39%
Farm D	54		14.81%	31.48%	53.70%		55.56%	11.11%	31.48%		44.44%	16.67%	37.04%

After reviewing the data mentioned above, the locomotion scores, originally ranging from 0 to 3, were simplified into three categories: score 0 (no lameness), score 1 (mild lameness), and scores greater than 1 (severe lameness). This adjustment allowed for a logistic regression analysis that accounted for random variations among individual goats.

The first analysis for each farm compared goats with no lameness (score 0) to those with any degree of lameness (score > 0). The second analysis examined the severity of lameness on each farm throughout the entire study period. The results of both analyses for all four farms are presented in Table 4.

Table 4: Results of the logistic regression analysis (p-values) with corresponding percentages of lameness scores in goats by farm and visit (N= number of animals scored, >0= number of animals with a locomotionscore higher than 0, %= percentage of total animals scored, P= P-value calculated in logestic regression model, >1= number of animals with a locomotionscore higher than 1)

FARM	VISIT	N	>0	(%)	P	>1	(%)	P
A	1	72	38	52.8	Ref.	16	22.2	Ref.
	2	72	52	72.2	0.01	18	25	0.79
	3	72	59	81.9	0.00	11	15.3	0.16
B	1	120	66	55	Ref.	6	5	Ref.
	2	112	66	58.9	0.45	7	6.3	0.40
	3	119	88	73.9	0.00	10	8.4	0.31
C	1	62	36	58.1	Ref.	3	4.8	Ref.
	2	61	41	67.2	0.27	3	4.9	0.99
	3	60	36	60	0.83	2	3.3	0.43
D	1	54	32	59.3	Ref.	2	3.7	Ref.
	2	54	38	70.4	0.23	5	9.3	0.13
	3	53	18	34	0.01	1	1.9	0.48

As shown in Table 4, the analysis revealed varying impacts of claw trimming on lameness across farms. On Farm A, a significant increase in lameness was observed one week after trimming. Farm B exhibited no significant differences in lameness one week post-trimming, though a significant increase was noted two weeks after trimming. Farm C showed no significant changes in lameness incidence across the whole study. Farm D did not show significant changes in lameness one week after trimming but did demonstrate a significant reduction in lameness cases by the second visit. Overall, across all farms, no significant differences were observed in the severity of lameness throughout the study period.

Discussion

This study aimed to investigate whether a single claw trimming event influences the incidence and severity of lameness in dairy goats over the course of two weeks. The results suggest that the impact of claw trimming on lameness is not consistent across farms. While some farms, like Farm A, showed a significant increase in mild lameness following trimming, others, such as Farm C, displayed no significant changes. Additionally, the overall severity of lameness (transition from mild to severe) did not change significantly across any of the farms, suggesting that claw trimming primarily affects the incidence of mild lameness rather than causing more severe lameness.

One of the key findings is the variation in outcomes across farms, which could be due to multiple factors, such as differences in the trimming company, individual trimmers, or farm management practices. For example, Farm A and C, which used the same trimming company, displayed different outcomes. This suggests that even within the same trimming company, variability in technique or attention to detail may influence the results. In future studies, standardizing the trimming company or individual trimmers could reduce variability and provide more consistent results. Additionally, implementing a blinded study design would reduce the potential bias of trimmers knowing which goats are part of the study, as this may influence how carefully they trim.

Another important aspect to consider is the methodology used to assess lameness. Although the same investigator performed the scoring on each farm to reduce bias, over time, the investigator may have become more skilled at distinguishing between locomotion scores. In another study, the observer was trained first before starting the actual scoring to prevent training during the trail (Anzuino et al., 2010). This increased accuracy could have influenced the results, particularly in the first set of comparisons. Future studies should include multiple investigators scoring the goats or implement training before the trail to mitigate potential bias and improve the reliability of the data.

The small number of farms included in the study limits the generalizability of the findings. Additionally, this study could not control for external factors that may have influenced the results. For instance, on Farm B, goats received a Q-fever vaccination just before the first visit, which could have affected their locomotion scores due to reduced performance and wellbeing (Bauer et al., 2024). Such external factors should be accounted for in future studies, or farms with recent interventions should be excluded from the sample.

Another factor that may have influenced the results is the condition of the claws before trimming. Literature suggests that goats with severely overgrown claws are more likely to develop sole hemorrhages and lameness after trimming (Sailer et al., 2021). In this study, the overgrowth of claws before trimming was not assessed, which may explain some of the differences in lameness outcomes between farms. Future research should include a pre-trimming evaluation of claw overgrowth to determine if the severity of overgrowth is associated with post-trimming lameness.

Furthermore, bleeding claws resulting from trimming too aggressively may have contributed to the lameness observed in some goats. Research highlights the importance of careful trimming to avoid complications such as bleeding, inflammation, or granuloma formation (Ibrahim et al., 2018; Winter, 2011). Including a measure of the number of goats with bleeding claws and their corresponding lameness scores could provide valuable insights into whether aggressive trimming exacerbates lameness.

Finally, the type and severity of claw lesions post-trimming may play a crucial role in the development of lameness. Previous studies have shown that certain lesions, such as footrot or sole abscesses, are significantly associated with lameness severity, whereas others, like white line separation or granulomas, are not (Chesterton et al., 2022; Hill et al., 1997). Future studies should consider evaluating the type and prevalence of claw lesions after trimming and investigating their correlation with locomotion scores to better understand the underlying causes of lameness.

Conclusion

This study assessed the effects of a single claw trimming event on the incidence and severity of lameness in dairy goats across four farms in the Netherlands. The findings indicate variability in the impact of claw trimming on lameness, with no consistent pattern across farms. This variation seems to be influenced by several factors, such as differences in trimming techniques, the skill level of trimmers, farm management practices, and the pre-existing condition of the claws. While the study has highlighted the importance of these factors, it also suggests that simply performing claw trimming uniformly across farms is not enough to guarantee success. Optimal trimming procedures must account for individual farm conditions and goat health status.

Therefore, it is crucial to develop and implement standardized trimming practices that are not only consistent but also adaptable to specific needs. Without this consideration, repeated trimming could continue to yield suboptimal outcomes, as seen in some farms. Thus, while the research highlights the importance of claw trimming, it also points to the need for refinement in practical applications to reduce the risk of lameness and improve overall herd health.

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