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COMPARISON OF PROFESSIONAL AND ON-FARM TRIMMING METHODS IN DAIRY CATTLE HERDS EXPOSED TO TRAUMAS

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Abstract

Lameness is third the most expensive diseases after mastitis and reproductive disorders. When remodelling dairy operations and introduction of novel technologies many farmers are still being tempted to save production costs in making hoof trimming either by themselves or giving that task to employees. In this study, further challenges such as changes in feed rations, heat stress, prolonged rainfall and/or other management practices effect of hoof trimming methods were recorded in 17 Hungarian dairy farms in 2010 and 2011 in a period lasting from May until November. Where building works were carried and trimming was done by trimmers being farm workers there was in average 22.8% increase in clinical lameness in comparison to average increase of 2.1% where professional trimmers where employed. Another type of farms was where mycotoxins were present in silage and where extreme level of urea in milk was reported. In those cases when on-farm trimmers worked 17.6% increase in lameness was monitored in contrast to 15.2% increase when professional trimmers were treating cows. Finally, when there was a swap from on-farm trimmers to professional trimmers 13.6% fewer cows were found with clinical lameness. Where professional trimmers where changed for on-farm trimmers 21.6% increase in occurrence of lameness was measured. In conclusion, traumas affecting the herd can be effectively minimised by providing professional trimming in comparison to on-farm trimming (increase of 1.9% vs. 15.3% respectively, \pm S.E.M. 3.84, $p < 0.05$).

Key words: dairy cattle, lameness, locomotion, trimming methods, claw disorder.

Introduction

Lameness is prevalent in modern dairy herds, reduces feed intake, live weight, milk yield, and milking duration (Enting et al., 1997). Claw disorders in dairy cows cause pain and are the main cause of impaired mobility in an environment that requires that cows move around on concrete for resources. Pressures exerted to the claw reach relatively high values during locomotion on a flat, hard surface and are resulting in horn damage.

Hassall et al. (1993) claimed that most claw lesions develop around the time of calving. Cows with painful claw lesions eat less, are more reluctant to move, and might consequently produce less milk than cows without claw lesions. Hultgren et al. (2004) and Alban et al. (1996) concluded that high milk yielding cows are more prone to lameness and claw lesions. Hoverwer, Fjeldaas et al. (2006) found lower milk yield in Norwegian herds with a relative low prevalence of claw lesions and this might be because of differences in diets among herds. Reductions in milk yield associated with claw and limb disorders are likely to be caused by reductions in feed intake or increased energy consumption because of pain, which can also be present without visible lameness (Whay, 2002). Cows with low milk yield, lameness and claw lesions are more likely to be culled (Sogstad et al., 2006). Correct hoof trimming can avoid culling and give the cow chance to stay in the herd, so far if she is producing expected amount of milk and has no serious locomotion problems (Gröhn et al., 1995).

Hoof trimming remains the most widely used method available to producers to prevent claw disorders from evolving from the subclinical to the clinical stage. Studies of (Manske et al., 2002 and Somers et al., 2005) had shown that long intervals between hoof trimmings or a lack of routine hoof trimming is associated with increase of lameness. Experimental studies demonstrated that short-term effects of good trimming improve traction between the hoof and the floor (Phillips et al., 2000) and weight bearing by the hoof (Sprecher, et al., 1997). On the other hand, van der Tol et al. (2004) and Fjeldaas et al. (2006) claims that routine hoof trimming is related to poorer health of hooves. De Passillé and Rushen (2006) also mentioned about affected locomotion after trimming. This is understandable, because as far cows are walking on concrete, on sharp surfaces, with holes and sharp concrete edges there will be always irritating feeling for cows for some time after trimming. The best solutions for cows would be if they were provided with straw on every concrete surface or if there were rubber mats e.g. in sharp corners when traffic makes a lot of cows hurting the hooves (Telezhenko et al., 2004). Claw trimming cannot be the only answer to claw health problems in cattle kept on concrete floors.

Improper trimming has been already recognised as factor contributing to occurrence of more locomotion disorders (Shearer and van Amstel, 2001). Fjeldaas et al. (2006) are sceptic about some trimming techniques and skills of people who are performing those treatments. A claw that is badly

trimmed becomes unstable on concrete creating pain and discomfort for the cow. One of the risks is over trimming what can contribute to bruising, lameness and increased risk of future claw overgrowth particularly on farms with sharp, eroded concrete. *Farm Animal Welfare Council* (1997) and *European Food Safety Authority* (2011) suggest that hoof-trimming should be carried out with care by professionally trained and certified personnel and when performed by farm employers specific training should be given. Small differences in trimming method can have a major impact on claw health and so keeping up-to-date with the latest views on best practice is recommended and probably highly cost-effective. *Reinemann et al.* (1999) found that cows found trimming procedure painful or unpleasant what was proved by increase of cortisol level which is often a sign of stress. This again confirms how important for cows' wellbeing is well performed hoof trimming. The most internationally accepted approach to effective claw trimming in Northern hemisphere is the Dutch 5 step functional trimming method and should form a part any herd claw trimming regime (*Bell, 2009*):

- Step 1. Trimming toe 'length' to 7.5 cm from coronary band and toe sole (8.0cm) with leaving (5-7mm step at toe) in the front
- Step 2. Trimming second claw to match trimmed claw - matched rather than measured
- Step 3. Dishing out the ulcer site to help prevent dirt sticking between the claws
- Step 4. Relieving weight off a painful claw – trimming down the heel horn or fix a block to the healthy claw
- Step 5. Removing loose/under-run horn and hard ridges

The general aim of the trimming technique is to increase the claw angle to induce a forward shift in weight bearing, particularly in claws with overgrown toes (*Toussaint-Raven, 1985*). This restores the balance of weight between claws of the foot and reduces the forces on the sole ulcer site. Proper trimming requires the right crush and herding the cows into it should not take more than a few seconds.

Before trimming 80% of the cows' weight is forced on outer claw and 20% on inner claw. The proper trimming technique aims to make proportion of 60/40. In the study of *van der Tol et al.* (2004) the weight bearing contact was assessed to increase in average during ordinary trimming from 27.5 to 41.0 cm² what decreases the pressure on the claw and its wearing. Unlike this study, *Toussaint-Raven* (1985) although measured increase of the contact area of 45% and a concomitant decrease of the average pressure by 30% those results were not significant.

Aim of the study is to check which trimming strategy is the most popular and which is the most effective on Hungarian dairy farms. In the time of cutting costs policies in dairy industry farmers have temptation to saving money by modifying trimming methods. There were a lot of investments in dairy facilities in Hungary, so functional trimming should be the first and the most important lameness

prevention on the farms. What is more, due to the weather complications some farms reported poorer quality of forage, which might influence not only milk production, but also cows' locomotion.

Material and Methods

Farm and animals

The project presumed dairy farms monitoring in Eastern and Southern Hungary. 17 Holstein Friesian farms were visited twice, for the first time from May to November 2010 and for the second time from May to November 2011. The selection was firstly created on a principle of searching for as different farms as possible where investments and changes related to improving welfare were made in 2010. On 8 farms engineering works were carried in the middle of the study (*Table 1*). Farm workers performing hoof trimming were present on 2 farms swapping straw yard for free stall barns, on one farm implementing automatic scrapers and on 1 farm renewing milking parlour. On the other 4 farms claw trimming was done by professional trimming team. On 1 farm alleys between barns and milking parlour were renewed, on the second farm cubicles in on of the barns were renewed and swapping from straw yard to free stall barn was carried on 2 farms. 4 farms were observed with feeding disorders. On 2 farms exceeded following levels of mycotoxins were observed: Alfatoxin Total > 0.005 mg/kg, T-2 > 1mg/kg, Zearlaenon > 0.15 mg/kg, DON > 2.5 mg/kg and exceeded level of *Clostridium perfringens* > 1×10^2 cfu/kg. On 1 farm relatively high level of urea in milk was reported (43 mg/dl). Finally, on 1 farm probable TMR imbalance was observed. On 3 farms there was change of trimming service. 2 farms were with no changes or out brakes reported. 10 different farms' trimming teams and 3 professional teams were judged.

Measurements

All milking cows leaving milking parlour were observed for occurrence of lameness. Cows were checked when walking on flat, clean concrete free of mud, muck and other contaminations which could make cows walking abnormally. For that reason locomotion scoring system developed by *Sprecher et al.* (1997) was used. This method has understandable objective descriptions of posture and gait for scoring. This also includes subdivisions between sound with imperfect locomotion and clinically lame cows. The system contains 5 categories of increasing severity. The first describes a normal locomotion and only considers the back position (flat while walking and standing). Another one describes a mild abnormality visible only when the animal walks when the back is arched. The last 3 scores classify a bovine as lame and the animals are arching of the back while standing and walking with more visible gait abnormalities. Researchers consider lame cows to be the ones with scores 3-5 (*Clarkson, et al.*, 1996; *Sprecher, et al.*, 1997 and *Cook*, 2003).

After farm observation farmers were asked for their opinions on lameness, measures taken on the farms with a special concentration on trimming procedures. To assess intra observer variation the test was done at the beginning and at the end of the research. Video record of 100 cows walking on a flat, clean concrete was done. Cows were observed on the video and results written down in the middle of 2010. The second observation in the middle of 2011 gave 87% correctness of estimations in comparison to results recorded in 2010.

Statistical analysis

Lameness estimations were put together into Excel for Windows. Results from 2010 and 2011 were compared using SPSS 13.0 for Windows by running a Chi² test using number of cows in particular scales form 1 to 5. For checking significance between changes on farms with on-farm trimmers and professional services univariate analysis of variance in SPSS 13.0 was used.

Results and Discussion

Observed average prevalence of clinical lameness was 23.8% in 2010 and 32.4% in 2011. Among 17 farms checked on 14 there was a highly significant difference reported in observations between 2010 and 2011 with $X^2(4, N = \text{from } 560 \text{ to } 1882) = \text{from } 16.149 \text{ to } 132.305$ and $p < 0.001$ (Tab. 1). Occurrence of lameness was found to be similar to *Huxley et al.* (2004), *Haskell et al.* (2006) and *Rutherford et al.* (2009) with 19.3%, 24%, and 39% of cows found clinically lame respectively.

Table 1.: Changes in occurrence of lameness after on-farm and professional trimming

Significance between 2010 and 2011	Claw trimming		Increase (+) and decrease (-) in average lameness occurrence between 2010 and 2011 (%)	No. of farms and changes observed
	2010	2011		
No	On-farm		+7,0	1 – automatic scrapers
	Professional		-1,7	1 – alleys between barns and milking parlour renewed
	No	Professional	-0.1	1 – trimming
Yes $X^2(4, N = \text{from } 560 \text{ to } 1882) = \text{from } 16.149 \text{ to } 132.305$ and $p < 0.001$	On-farm		+7,7	1 – no change
	On-farm		+22,8	1 – milking parlour renewed 2 – straw yards swapped for free stalls
	Professional		+2,1	1 – cubicles in on of the barns were renewed 2 – straw yards swapped for free stalls
	On-farm		+17,6	1 – high level of urea 1 – mycotoxins
	Professional		+15,2	1 – mycotoxins 2 – TMR imbalance
	On-farm	Professional	-13.6	2 – Change in trimming
	Professional	On-farm	+21.6	

On 2 farms where farm workers were performing hoof trimming there was increase in occurrence of lameness observed of 7.7% for unknown reasons.

When engineering works were carried cows shown more locomotion problems. On 3 farms where farm workers were working there were in average 22.8% more cases and on farms where professional company was working there were in average only 2.1% more lame cows.

On 1 farm with presence of mycotoxins (Alfatoxin Total = 0.00727 mg/kg, Zearlaenon = 0.296 mg/kg, DON = 5.14 mg/kg and exceeded level of *Clostridium perfringens* > 5.5x10³ cfu/kg) and extreme drop in milk yield in all groups of cows (in average from 9456 to 5493 l/lactation checked between 2011.02.14-2011.03.26) and on 1 farm with relatively high level of urea in milk (43 mg/dl) with on-farm trimming team there was growth in lameness of 17.6%. In comparison, on 1 farm with probably energy imbalance caused by low quality forage and on 1 farm with mycotoxins present in silage mycotoxins (Alfatoxin Total = 0.00639 mg/kg, Zearlaenon = 0.175 mg/kg, DON = 4.84 mg/kg) with professional trimming service there was increase in average occurrence of lame cows of 15.2%.

On farms where on-farm trimming was changed for professional claw trimming company there was 13.6% drop in average number of lame cows. On the other hand, when farm employers were working in place of professional trimming service 21.6% increase in prevalence of lameness was observed.

Although on 3 farms there were no significant differences between 2010 and 2011 one can observe that on-farm trimming method shows increase in 7% and professional trimming slight drop in lameness cases.

On farms where claw trimming was performed by farm workers there was in average significantly more lame cows than on farms where professional trimming service was employed (15.3% vs. 1.9% ± S.E.M. 3.84, p<0.05). However, there were no significant differences between professional and on-farm hooves' treatments in groups of Engineering works, Feeding disorders and Change in trimming. This is probably because of lack of power due to very low number of variables.

Although lameness was already reported 20-30 year ago as a disease significantly decreasing dairy cows' performance relatively small progress was done in creating feasible management practices against it. If routine trimming was found to be a preventive way for treating claw disorders, this procedure should be done properly on every farm. However, in the study 67% of farmers underestimate the occurrence of lameness on their farms. That means farmers have not enough skills for monitoring and judging which cow is normal, mildly lame, moderately lame, lame or severely lame (Sprecher, et al. 1997). That ability helps to estimate when immediate actions should be taken for preventing cows not to be lamer. That also helps in estimating which trimming method(s) and trimming individual(s) are more effective in



decreasing lameness. Lameness is painful for cows what was proved by *Chapinal et al.* (2010). Researchers reported that before hoof trimming, lame cows spent more time lying down each day than nonlame cows. Bad locomotion is disturbing for lame cows and this is why they are looking for a relief. Trimming by itself is also making kind of trauma for cows. The same authors founded that both lame and nonlame cows increased the time spent each day lying down after hoof trimming for up to 5 wk after hoof trimming. In the study all farms were visited approximately 5-10 weeks after the hoof trimming to avoid the change in gait following hoof trimming *Chapinal et al.* (2010).

The most popular opinion among farmers about high percentage of lame cows is thought to be a bad quality feed stuff given to animals. This is presumed happening because of extreme changes in the weather influencing quality of forage and maize silage what caused imbalanced TMR or feeding higher amount of concentrates and effects with cows being lamer. Importance of housing technology and farm hygiene is equally important. The second reason is heritage of old buildings from the socialism time. In most of the cases, those buildings were originally used for tethered cows. After swapping to the free stall or straw yard housing systems no significant improvements were done. Finally, the lack of workforce and cutting costs policies are important factors influencing that not enough attention and time can be spent to decrease lameness in opinions of farmers and farm managers. There is a vast majority of reasons there are a lot of lame cows present in the modern dairy industry. Claw trimming is not the only way for preventing lameness, but when done properly definitely has a positive impact on cows' mobility.

In the study under consideration should be taken unpredictable factors which might influence results interpreted without clear explanation. Those would be feeding, weather, human resources and others. As an example can be 2 farms where in theory there were no differences in husbandry during one year, however, there was increase in lameness.

There is a specific time on dairy farm when any building works are carried on, because every day activities are changing. Cows might be walking around working places, avoiding ways of vehicles what makes a risk for longer distances, worst surface quality, more holes or presence of stones. Observations confirm that farm workers were less confident with cleaning claws of stones than trimming services' employers. The study proved that professional care of cows' hooves is more efficient than skills of farm workers in time of trauma caused by engineering works and adaptation to new husbandry systems. What is more, scientific opinion of *EFSA* (2009) about welfare of dairy cows in relation to leg and locomotion problems states that animals kept in free stall barns are at higher risk of being lame in comparison with straw yards. *Haskell et al.* (2006) also found that lameness scores were higher on free stalls farms compared with straw yards farms. When cows are introduced to new facilities extremely important seems to be to provide them with the best lameness preventive solution which is professional trimming.

Nutrition has significant influences on claw health in dairy cattle. So far studies related to feeding and laminitis are not giving promising conclusions (*Westwood et al.*, 2003). Acidosis is considered to be the predominant predisposing cause of laminitis (*Chapinal et al.*, 2010). Any nutritional practice that results in a decrease of rumen pH below 5.5 can result in chronic sub clinical laminitis.

Dairy industry like other businesses is at risk of cutting costs policies to be able to produce a final product in sustainable way at the lowest price possible. Sometimes farmers not literally seeing outcomes of professional trimming have tendencies to substitute that activity by employing farm workers. In the research, on the farm where trimming was done by farm employees instead of company there were extremely more lame cows (21.6%). Unfortunately, from author's experience, in most of the cases those people are not trained properly for maintaining such important task. Labour force is usually occupied by other farm activities, there is lack of repeated trainings and there is no monitoring of trimming quality and curing progress. On the other hand, when bright farm managers can see no improvement in lameness, decision comes to employ professional company. This solution is more effective in comparison to farm workers. Half-solution is when professional team is called, either only to trim cows when they are very ill or to run a workshop for farm workers trimming cows. Nevertheless, training should be renewed routinely to keep skills on professional level (*van der Tol*, 2004).

Once a cow has chronic lameness, then the natural wear associated with normal mobility and locomotion are lost and imbalances between claw horn growth and wear becomes a permanent problem. This situation occurs when except professional trimming e.g. 2 times a year cows with the worst locomotion dischargers are not treated and are waiting for the next trimming which might be in the next 4-6 months. Farms where professional treatment is applied are more likely to take care of cows' hooves between routine trimmings than farms with private trimming team.

Why (2002) calculated that in the UK average case of lameness costs £178 per year and the average herd is loosing about £10 000 per 100 cows every year. Money lost with a single lame cow equal treatment of 18 cows using a professional claw trimmer. In Hungary where prices of cows being ill are comparable and where labour is much cheaper, this would be even 30 cows. This seems to be a very cost-effective way of preventing lameness disorders for most herds in Hungary, if done properly and may reduce, for example infertility. It is interesting why so many farmers are still capable to not employ professional claw trimmers and are putting cows at risk giving that task to workers employed on the farm.

There are golden rules for preventing lameness in dairy herds (*Toussaint-Raven*, 1985). Trimming should be avoided when cows are turned out on very long or abrasive tracks (e.g. tarmac or concrete). This happens often when cows are trimmed and need to walk few hundred meters between barns and milking parlour few times a day on concrete. None of the farms monitored provided rubber mats between

barns and milking parlours. On 4 farms there were rubber mats in the milking parlour. On 3 farms there was straw on alleys between barns and milking parlour. Special attention with trimming should be paid to freshly calved cows (first 4 weeks of lactation), as they are under strain and horn growth is less than wear and this raises the risk of thin sole after trimming (Whay, 2002). None of the farms takes into account special treatment of freshly calved cows regarding trimming. All herds are different and probably the best way for trimming would be a system designed to the individual cows, which would come from reliable records. However, this is also can be very rarely experienced to find a Hungarian farm manager with clear records of lameness cases.

The most often reasons for higher prevalence of lameness where on-farm teams worked and less common in professional groups would be:

- Not cleaning properly area between inner and outer claw
- Using spray on not cleaned area between inner and outer claw
- Not dishing out the sole ulcer
- Not making dishing on outer claw larger for relieving weight off the sole ulcer site
- Bruising or under-running horn
- Blunt tools and lack of proper grinders for sharpening
- Letting cows to walk in the manure after serious bleeding or treatment on haemorrhages with spray
- Using bandages and letting cows to walk in the mud and dung
- Improper crushes where cows are not stable making them stressed and making trimming affected
- Improper crushes without barriers helping to herd cows into the crushes
- No training and its routine repetition for performing trimming

Cheaper and quicker solutions, like various hoof trimming methods, have a great chance for decreasing level of lameness significantly. The best combination is found when professional team is running the service with occasional treatment of cows with the worst cases. Regular visits with locomotion scoring in advance of the trimming makes sure correct cows are treated and performance of trimming can be monitored. This hoof management strategy was already described in the literature (Toussaint-Raven, 1985; van der Tol et al., 2004 and Bell, 2009), but unfortunately farmers not always find this method useful. One of the reasons is time and money issues and the other one is that farmers get used to bad conditions and do not realize when bad becomes worst. Alternatively staff work can carry out this work, but essential course and routine trainings should be provided. There should be monitoring of lameness and comparison of hoof trimming teams. There is a huge variation between farms and cows regarding job needed to perform proper trimming, but general information about performance of the

particular hoof trimmer (or a team) should be used for successful lameness treatment. Sadly, many farm managers are not interested in checking different trimming methods or services. Human nature of becoming used to everyday activities creates a risk that self confidence in performing trimming overwhelms curiosity for checking quality of that trimming or comparing to others.

Conclusions

Professional trimming was found to be more effective than on-farm trimming on farms with engineering works, feeding disorders and when trimming was changed from on-farm to professional one and vice versa.

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