



## Remidial Hoof Trimming: A Curative Measure for Thrush

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### Abstract

The study was conducted on twelve thrush affected horses, which were grouped as Group A (trimming with medicinal treatment, n=6) and Group B (Medicinal treatment alone, n=6). The effectiveness of trimming was assessed with measurements of hoof before and after treatment. Statistical analysis revealed apparently less median recovery time (8.5 Vs. 11 days) and significant increase in frog size in horses treated with trimming. Results showed that therapeutic trimming helped in recovery of thrush by reducing time and also improved development of frog area by correction of hoof balance.

**Keywords:** Hoof; Therapeutic trimming, thrush

## Introduction

There may be no other routine procedure performed on the equine athlete that has more influence on soundness than hoof preparation and shoeing. Physiological shoeing could be defined as that which promotes a healthy functional foot, biomechanical efficiency and prevents lameness (Butler 1986) [1]. Trimming and shoeing can affect a variety of important parameters, including, the phase of stride (the manner in which the foot lands, the duration of the stance phase and breakover), normal foot function, injuries related to landing and weight bearing. A thorough knowledge of proper traditional horseshoeing (Butler 1986; Hickman and Humphrey, 1988; Curtis, 1999) [1,2,3] enables the veterinarian to interact with the farrier to enhance and promote the quality of hoof care.

Thrush is an infective condition of the frog and its sulci, which results in degeneration of the horn (the protective frog callous) and the production of foul smelling gray/black discharge (Aiello and Mays, 1998) [4].

Singh *et. al.* (2010) stated that thrush is a common condition affecting the frog of the equine hoof. They treated a case of thrush in a working pony with triple sulphate. O'Grady (2018) [5] reported that trimming of hooves to put the frog and heels in normal position is necessary with alignment and level of frog with the rest of the foot promotes the growth which helps in treatment of thrush. Danvers (2011) [6] recommended that one of the most important factors in avoiding and/or eliminating thrush is exercise. Hence this work is carried out to reveal the effect of therapeutic trimming in recovery time of thrush.

## Materials and Method

All horses presenting with lameness, hoof disorders and thrush were diagnosed based on clinical signs, palpation and gross observation. The hoof affections were broadly classified in three sub category viz. toe, quarter and heel affection according to anatomical location in the hoof. The animals with hoof affections were restrained and all four hooves were thoroughly cleaned and examined to classify the condition and treated with antiseptic dressing, bandaging and hoof paring.

Among them 12 cases of thrush were selected. All the selected

cases were randomly divided into two groups: Group A (n=6) was treated with the application of copper sulphate, povidone powder and zinc oxide (1:1:1 mixture) with the help of diaper locally. Group B (n=6) was treated with therapeutic hoof trimming in addition with the same medicinal treatment as Group A. The time of recovery was compared clinically in both the groups.

Evolution of trimming in thrush affected horses was carried out with common medicinal treatment given to all the horses. The effectiveness was assessed with dimensional measurements of hoof before and after treatment in 12 horses.

Kaplan-Meier survival analysis was done to see the interval from the treatment of thrush initiated to the complete recovery. A log rank test was run to determine the statistical difference in the recovery time between group A and group B. Pearson chi-square test was applied to see the association between the treatment and recovery interval. Data were first checked by Shapiro-Wilk test for adherence to a normal distribution. Independent t-test with unbalanced/unequal sample size was used to compare the difference between thrush affected and unaffected limbs for frog and hoof measurement as well as between groups for duration of illness and data were presented as mean±SE. Mann-Whitney U Test test was used to compare the width of hind limb frog in thrush affected and data were presented as mean±SD. frog and hoof measurements in thrush affected horses were analyzed using GLM repeated measure ANOVA with terms for group, time period and their interactions included in the model and animal within group.

## Results and Discussion

The mean values of hoof and frog measurements in thrush affected limbs were given in Table 1. There was significantly smaller frog (length and width) in affected than the unaffected fore limbs (P<0.05). There was also the shorter frog length in affected than the unaffected hind limbs (P<0.05). However, the width of frog was apparently shorter in affected than the unaffected hind limbs. The hoof measurements did not differ significantly in thrush affected and unaffected limbs (P>0.05). In addition, the frog area was smaller in thrush affected than the unaffected limbs (P<0.05, Table 2).

Parameters	Affected		Unaffected		P
Frog Length Fore limb	05.05±0.36 <sup>a</sup>	n=10	07.89±0.34 <sup>b</sup>	n=10	0.01
Frog Length hind limb	02.65±1.53	n=04	07.22±0.25 <sup>b</sup>	n=04	0.01
Hoof Length Fore limb	12.09±0.29	n=12	12.13±0.28	n=12	0.94
Hoof Length hind limb	12.05±0.26	n=12	12.16±0.26	n=12	0.77
Frog width Fore limb	02.12±0.21 <sup>a</sup>	n=10	05.10±0.23 <sup>b</sup>	n=10	0.01
Frog width hind limb#	02.55±3.06	n=04	03.70±1.55	n=04	0.51
Hoof width Fore limb	08.82±0.39	n=12	08.97±0.37	n=12	0.79
Hoof width hind limb	08.01±0.39	n=12	08.21±0.42	n=12	0.72

Mean bearing different superscripts (a, b) differs significantly within row (p<0.05)

#Data was presented as Mean±S.D

**Table 1:** Mean (±SEM) values of hoof and frog measurement (cm) in thrush limbs

Parameter	Affected		unaffected		P
Frog area Forelimb	5.588±0.78 <sup>a</sup>	n=10	20.16±1.35 <sup>b</sup>	n=14	0.001
Frog area hind limb	4.887±1.29 <sup>a</sup>	n=6	18.84±1.34 <sup>b</sup>	n=18	0.001

Mean bearing different superscripts (a, b) differs significantly within row (p<0.05)

**Table 2:** Mean values of frog area (cm<sup>2</sup>) of thrush affected and healthy limb

The application of copper sulphate, povidone powder and zinc oxide (1:1:1 mixture) using elastic diaper proved efficacies to cure thrush in both the groups after four consequent application. The breathable membrane of diaper provided the ideal aerobic environment for healing.

The frog and hoof measurements in thrush affected horses (before and after treatment) were given in Table 3 There was significant (P<0.05) effect of time (days) on the recovery in thrush affected horses in group B. However, apparently increasing values also found in group A. Further, there was no significant (P<0.05) effect of treatment on the thrush recovery among the groups and correlation between recovery time and duration of illness was found. Further, there was also no

significant (P<0.05) time and treatment interaction in thrush recovery among the groups. The frog length and width were significantly increased on day 30 than the day 0 in group B (P<0.05). The frog length and width were apparently higher in group B than the group A. There was no significant difference in hoof length within the group (P>0.05). However, the hoof width was significantly (P<0.05) reduced from day 0 to 30 in group B (8.25±0.41 vs 7.85±0.40 cm) and hoof length was also apparently reduced. Moreover, the hoof length and width were significantly reduced in group B than the A (P<0.05). Further, the frog area was significantly increased from day 0 to 30 in both the groups (P<0.05, Table 4). However, the frog area was apparently higher in group B than the A on day 30 (8.091±1.26 vs 5.963±1.0).

Parameter	Group	0 day	30 <sup>th</sup> day	D	G	D*G
Frog Length	A (n=8)	04.44±0.76	05.04±0.46	0.007	0.85	0.26
	B (n=6)	04.26±0.88 <sup>a</sup>	05.55±0.53 <sup>b</sup>			
Frog width	A (n=8)	01.76±0.34 <sup>a</sup>	02.21±0.25 <sup>b</sup>	0.001	0.06	0.06
	B (n=6)	01.86±0.40 <sup>a</sup>	02.83±0.28 <sup>b</sup>			
Hoof Length	A(n=8)	12.46±0.30	12.50±0.30 <sub>A</sub>	0.278	0.03	0.16
	B (n=6)	11.55±0.35	11.28±0.34 <sub>B</sub>			
Hoof width	A (n=8)	08.57±0.41	08.95±0.40 <sub>A</sub>	0.077	0.06	0.01
	B (n=6)	08.25±0.41 <sup>a</sup>	07.85±0.40 <sup>b</sup> <sub>B</sub>			

Mean bearing different superscripts (a, b) differs significantly within row (p<0.05)

Mean bearing different subscripts (A, B) differs significantly within column (p<0.05)

**Table 3:** Mean (±SEM) values of frog and hoof measures (cm) in thrush affected horses

Parameter	Group	0 day	30 day	D	G	D*G
Frog Area	A (n=8)	4.686±1.07 <sup>a</sup>	5.963±1.09 <sup>b</sup>	0.01	0.47	0.04
	B (n=6)	4.887±1.23 <sup>a</sup>	8.091±1.26 <sup>b</sup>			

Mean bearing different superscripts (a, b) differs significantly within row (p<0.05)

**Table 4:** Mean (±SEM) values of frog area (cm<sup>2</sup>) in thrush affected hooves

The mean duration of illness was 30.83 ± 9.697 and 39.17 ± 12.41 days in group A and B, respectively. A log rank test on Kaplan-Meier survival curve showed non-statistical difference on recovery duration ( $\chi^2_{df1}=0.8054$ , P=0.3695; Fig. 4.10). Pearson’s chi-square test also revealed that there was a non-statistical significance association between trimming of hoof and the thrush recovery time (P>0.05). However, there was apparently median recovery time in group B was lesser than

the group A (8.5 vs 11 days). Horses treated with medicine and trimming got prompt recovery than solitary treated with medicines. Statistical analysis also shows that there was apparently less median recovery time (8.5 vs 11 days) and significant increase of frog size in horses treated with trimming. Results show that therapeutic trimming helped in recovery of thrush by reducing time and also improve development of frog area by correction of hoof balance (Figures 1,2,3 and 4).



Figure 1: Medication for treatment of thrush



Figure 2: Trimming of hoof

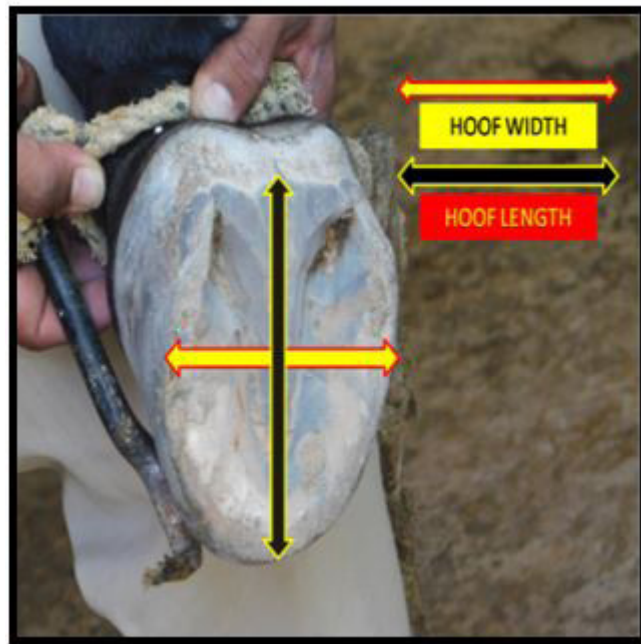


Figure 3: Measurement of hoof

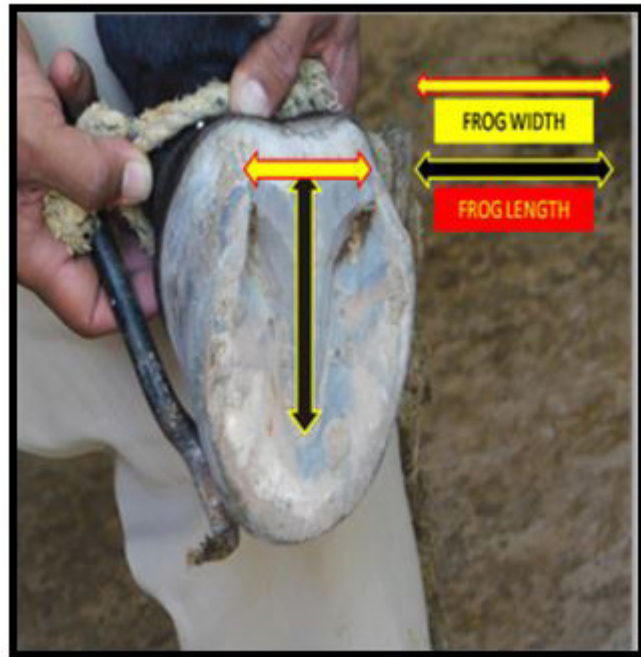


Figure 4: Measurement of frog

### Conclusion

Therapeutic trimming helps in recovery of thrush by reducing time and also improve development of frog area by correction of hoof balance.

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