

# Trimming Significantly Changes Hoof Morphology

Study concludes the mustang roll trim is detrimental to the equine foot

By Jeff Cota, Managing Editor

**A**lthough farriers have been tending to horses' hooves for thousands of years, there is no universal acceptance for the way they are trimmed. In some circles, the conversation can be rather acrimonious.

The lineage of wild horses split from domestic horses about 45,000 years ago, according to "The Evolutionary Origin and Genetic Makeup of Domestic Horses," a study led by Pablo Librado and published in the October 2016 issue of *Genetics*. About 5,500 years ago, man started interacting much more with the domestic line of horses, and they were domesticated. For the first couple of thousand years, though, horses weren't handled much, nor ridden. Rather, they were used for meat and milk.

Historically, it's difficult to pinpoint the origin of the horseshoe since worn out iron was generally melted down and reused. Four bronze horseshoes were discovered in 1897 in an Etruscan tomb dating from the fourth century B.C., according to "Etruscan Horseshoes from Corneto," published by the *American Journal of Archaeology* in 1902.

"So that's about 2,500 years," Australian equine hoof researcher Brian Hampson told attendees at the 2017 International Hoof-Care Summit

in Cincinnati, Ohio. "You would have thought that we would have developed enough knowledge and agreement in that time that there wouldn't be any argument on trimming methods, but apparently there still is."

## Goals Of The Study

Inspired by the 2011 study, "Effects of barefoot trimming on hoof morphology," that was led by equine veterinarian Hilary Clayton and pub-

## I don't see the point in cutting the toe off ...

lished in the *Australian Veterinary Journal*, Hampson documented various styles of barefoot models and how they affected hoof morphology.

"The goals of the study were to document the changes over a 12-month period when these horses went through a change of trimming model from a basic model, standard sort of trim, to something that someone thought was a little bit special," he explains. "We wanted to know whether the capsule at the end of that 12 months actually fitted into what the philosophies of that trimming model were. [We also wanted to know] whether they made the changes that they thought they were going to with the horses.

"And something that I was

particularly interested in was whether there could be an increase or a change in the soft tissue volume in the palmar foot over a 12-month period because they were being changed to a particular type of barefoot trim."

Hampson cast a wide net to recruit barefoot trimming schools to participate in the study.

"I did a lot of negotiating with a dozen of them, but we got dropouts along the way," he says. "There were four schools that put their hands up and said, 'We'll put our money where our mouth is and we'll join the study.' I was really happy with that. Actually, four was more than what I thought I would get."

The four schools that agreed to participate are:

- ◆ **Barefoot Hoof Orthopedics.**
- ◆ **Pacific Hoof Care Practice.**
- ◆ **Natural Hoof Care.**
- ◆ **Hoof Print Method.**

"We've got a variety of trimming models," he said. "Many claim that they're the best and that they get this, that and the other sort of achievements. But I think we don't really know exactly what constitutes that trim. I think it's a good idea to document a few of them so we can make more informed decisions about who we want to trim the horse and what sort of trim we want."

Hampson and his team established a protocol for each participant to follow, including:

- ◆ **Each team selected six horses.**

"What I asked them to do was find a horse that didn't have a lot of pathology," he says. "Well, preferably no pathology at all, but with a foot that they thought they could change. So, if your philosophy is that you don't like a long toe, find a horse with a long toe, low heel and then make a change to that with your trimming method.

## FARRIER TAKEAWAYS

- ▶ Trimming methods can significantly change the morphology of the equine foot.
- ▶ The practice of aggressively trimming the toe drastically reduced the length of the toe by an average of 26%.
- ▶ The mustang roll is detrimental to the health and stability of the equine foot and it is the antithesis of natural.

We had two horses pull out along the way. Over a 12-month study, that wasn't too bad."

◆ Each horse was to remain untrimmed 6 weeks before the start of the study.

"Who the farrier or trimmer was before that didn't matter," Hampson says. "Trimmers had to choose a foot that they could do something with."

◆ Each horse was to be trimmed every 6 weeks for 12 months.

"The studies were done where the trimmers lived," he says. "The majority of the trimmers were those leaders in their school, so their main trimmer or farrier. Some of the trimmers were farriers, as well. They did the trimming themselves at regular intervals."

◆ Photographs and radiographs were required before and after the trimming program.

"We had to be very strict about our trimming criteria, every 6 weeks," Hampson says. "I communicated at times with their local vet and they took the radiographs in a nice, standardized way."

◆ The assessor was neutral and blinded.

"All of the data was sent to me and then I handled the data," he says. "I'd consider myself fairly unbiased, as far as the data goes and which trimming methods there were. I was blinded to the feet. So all of the identifying landmarks were taken off of the feet when I was going through and measuring them. The Excel spreadsheets weren't labeled with the trimming method either, so all the data was blinded to me."

### Final Trims

Hampson presented an average representation of each of the four trims that were given 12 months after the program had started.

"All of the trimmers were happy



Figure 1a



Figure 1b



Figure 2a



Figure 2b

with the feet at the end of the 12 months," he says. "They had created the foot that they wanted or they'd managed the foot that they wanted."

**Barefoot Hoof Orthopedics.** "This

group was a little bit different than the other trimmers. They don't believe in taking length off the bottom of the hoof. Konstanze Rasch believes that if we make big adjustments to the length of the hoof wall from trimming underneath it, then we stress the joints above. If she wants to shorten part of the hoof wall, she'll thin the outside wall and allow the movement of the horse to do the work of the trimming.

"She prefers to make very slow adjustments rather than making one adjustment in one day with the rasp. She's trying to speed up the wear and tear on the hoof by thinning it (Figure 1a). If we take the same point, you can see it's a much thinner wall on the medial hoof than what it is on the lateral hoof (Figure 1b)."

### Pacific Hoof Care

**Practitioners.** "So that's their standard trim (Figures 2a and 2b). My main comment about the trim is after 12 months this is not a horse with any sort of pathology, but they've got the wild

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Figure 2c



Figure 2d



Figure 3a



Figure 3b

horse model in their mind. [They've incorporated] a mustang roll, all the way around, so the outside hoof wall tubules don't get a chance to interact with the ground with that trim. The roll extends all the way back, almost to the heel.

"Looking at him from underneath (Figure 2c), this is after the trim. I don't believe there's been any rasping on the bottom of that foot. If you are going to do this to the hoof wall that's significantly thin, so this horse doesn't really need much trimming from underneath. If the horse is doing enough activity, it's going to self-trim.

I just popped the X-ray (Figure 2d) in there just to see that the toe has been dubbed vertically and then rolled."

**Natural Hoof Care.** "So once again, I think the wild horse model has been taken onboard here (Figures 3a and 3b). You can see that there's a mustang roll. It's just not done as neatly as what the last one was. The hoof has been taken back to the white material, which is on the inside of it. Some of the barefoot trimmers like to call that the water line, where there's more moisture content on the inside of the hoof. They believe that's the correct bearing surface for the hoof wall.

"That's the same foot, just looking at the solar surface (Figure 3c). The heels have been trimmed and you can see that flat rasp has been placed across that. So we've got this room of sole that is bearing at the same level as the hoof wall. Once again, toe is dubbed down." (Figure 3d)

**Hoof Print Method.** "My main comment with this foot is that it's kind of like a natural rock and roller, isn't it? Now, breakover is right back where the ruler is (Figure 4a). The ruler's not there to show where breakover is, it's there to measure 70 centimeters for the camera length. But

there's air under there, all the way back to about this point.

"You can see from this dorsal view (Figure 4b) that this hoof wall is maybe 10 millimeters off the ground, getting toward 1/2 an inch off the ground. So obviously, this trimmer from the Hoof Print Method doesn't like that toe to be on the ground in this midstance. So the same foot, just looking at it from underneath (Figure 4c). You can see how thin the hoof wall is, just a couple of millimeters thickness of hoof wall there."

### Key Findings

Hampson measured a number of areas to determine what changes, if any, occurred as a result of the four trimming methods.

**Distal phalanx, lamella zone thickness and extensor distance.** "The

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Figure 3c

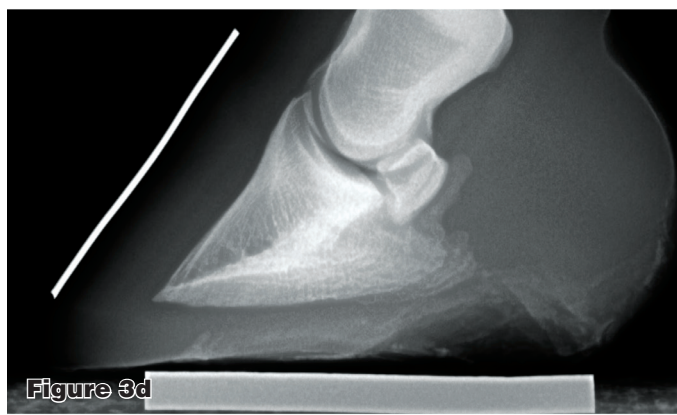


Figure 3d



Figure 4a

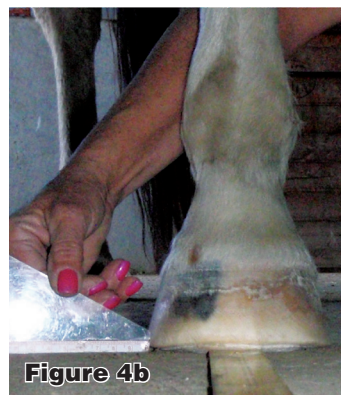


Figure 4b



Figure 4c

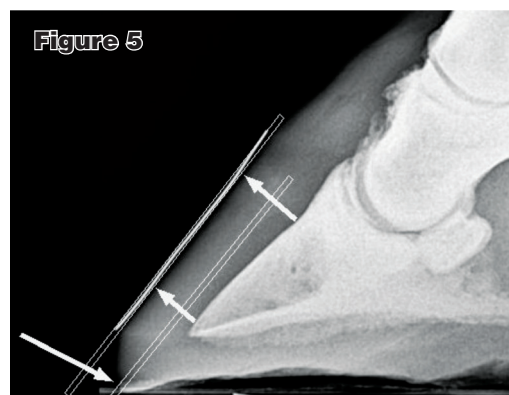


Figure 5

length of the distal phalanx doesn't change in a mature age horse. The lamella zone thickness from the hoof wall out to the outer hoof wall; that doesn't change in a mature age horse as well from over a 12-month period, unless there's been a laminitic event. The extensor or the sinker distance shouldn't change either unless there's some sort of pathology.

So it was nice to see that these three measurements didn't change. If they had changed, there'd be something wrong with our measurement protocol, OK? So they should be the same before and after. So it's good to see that we had some reliability in our measurements."

**Tip of the distal phalanx at the lamella zone.** "Three of the trimming groups significantly reduced the tip of the distal phalanx at the lamella zone and one of them didn't. Barefoot Hoof Orthopedics didn't significantly reduce the thickness of the hoof wall on the center at 0.01.

"I'll give you some statistics as we go through whether they're significant. In scientific terms, if we've got a P-value of less than 0.05, we say that's significant and we can call that a change. If it's greater than 0.05, there's no change. So we'll stick with the statistical definition."

**Sole thickness.** "It was a little bit of a surprise to most of our trimmers that all groups reduced the sole depth or the sole thickness over the 12-month period. And overall, there was a 20% reduction.

"The trimmers who were involved in this study really enjoyed the study and they received feedback after it. I gave them all the measurements and I

wrote a paper for them explaining in very objective terms what we found in the study. I think it was great feedback for them and the sole thickness was probably the biggest surprise for them."

**Toe length.** "Toe length, from the tip of the distal phalanx to the breakover point, was significantly reduced by an average of 26% (Figure 5). If you dub

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that toe, you're going to reduce it and that happened in three of the groups. Once again, Barefoot Hoof Orthopedics didn't reduce the toe length. The range here was from 8% reduction in one group to 40% reduction in another."

**Foot length.** "There was no change in overall foot length. Pacific Hoof Care Practitioners had a 10-millimeter (mm) reduction, while Barefoot Hoof Orthopedics had an increase in that overall foot length. All of the trimmers said that they would have liked to see an increase in the bearing border length."

**Dorsal and palmar foot length.** "I'm just looking at the foot length beyond the tip of the distal phalanx when measuring the dorsal foot length. There was an overall reduction because of the toe dubbing, but there was no reduction when measuring the final trim of Barefoot Hoof Orthopedics."

"What's more interesting probably, though, is the length of the foot bearing onto the ground behind the tip of the distal phalanx, which is the palmar foot length. That increased by 8% overall. The range of the groups was from 3mm up to 10mm, and the trimmers were happy with that because one of their goals was to get more foot on the ground in the palmar foot, so behind the tip of the distal phalanx."

**Heel bulb length.** "One of the goals of two of the groups was to increase the volume of the palmar soft tissue. However, there was no change in any of the groups. One group had a slight decrease, but it was not significantly different."

**Angular measurements.** "As far as our angular measurements go, the dorsal

hoof wall angle didn't change and neither did the palmar angle. There was a slight increase overall in the heel angle of all 22 horses. There was a reduction in one group of almost 6 degrees, which is a big drop in heel angle over a 12-month period. While there was a 6-degree increase in heel angle by another group, so there was quite a lot of variation between trimmers there."

**Width parameters.** "There was no change in the measurements of the widest point of the frog in the 22 horses considered as a big group. If you consider them separately, there was no change, either."

## Toe length was significantly reduced by an average of 26% ...

That was a shock to the trimmers. One of the main goals of at least three of those trimmers was to increase the size of the frog and widen the heels.

"Overall, there was a slight reduction — about 1/4 of an inch — in heel width. The range was an 18mm reduction by the Hoof Print Method group to a 2mm increase by Pacific Hoof Care Practitioners. The tighter heels were definitely significant; however, the increase wasn't significant. So, we can say that there was no change.

"There was a slight reduction overall in foot width. Some of the groups would have liked to get more foot on the ground and expand that."

**Heel bulb length.** "This study showed

no change in the heel bulb length measurement. So we would be reasonably confident in saying that the palmar soft tissue volume in these feet didn't change."

### Conclusion

Hampson's study found that each of the four trimming methods significantly changed hoof morphology over the 12-month period.


"Sometimes those changes were in accordance with the philosophy that the trimming group had, but they weren't always," he says. "The trimmers were quite surprised at times about the changes that were made, as well as about some of the changes that weren't made."

Among the most critical findings of the study are the consequences that dubbing the toe — or the mustang roll — has on the equine foot.

"The thickest part of the hoof wall is the dorsal toe," Hampson says in explaining the significance of the hoof wall. "It thins out toward the heel quarters, then it thickens up again in the buttresses — and that's for good reasons. It's thick here [in the back of the foot] because the heel slams on the ground in heel strike. In toe off, there's large lever forces in the dorsal foot, so you need a lot of meat there to be able to absorb that shock and to be able to pass it on and withstand it."


Despite the claims of its advocates, Hampson says the mustang roll is not a natural trimming method and further, it's detrimental to the horse.

"I don't see the point in cutting [the toe] off and I really haven't had anyone be able to give me a good explanation for why that's done," he says. "The best explanation that people give me is that that's the wild horse's foot, it's a mustang roll, that's what you see in the mustang. Because it's natural, it must be good.

"Chris Pollitt and I spent 4 years finding out what the wild horse or the feral horse's foot looked like, and it didn't look like that. The only time it looked like that with this mustang roll was when these horses were right on the edge of death and they were doing too many miles and that foot was worn out. So I'm not convinced that that's a natural horse's foot and I'm not convinced that bearing the horse on its sole by taking the hoof wall away is a good thing." 



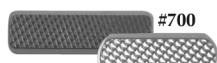
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