



## Foal Feet

The development and trimming of the young equine lower leg and hoof

By Pamela Smith

Foals are born with a soft extension on the bottom of the hoof, covering the end



of the hoof wall as well as the frog. The entire hoof wall is fairly soft and is not designed to bear the foal's entire weight. The feathery frog tissue comprises a large portion of the ground surface of the newborn hoof. Foal hooves are nearly cylindrical at birth. For the hooves to devolve properly they require repeated concussion on firm terrain to spread the hooves out into the truncated cone shape of the adult horse.

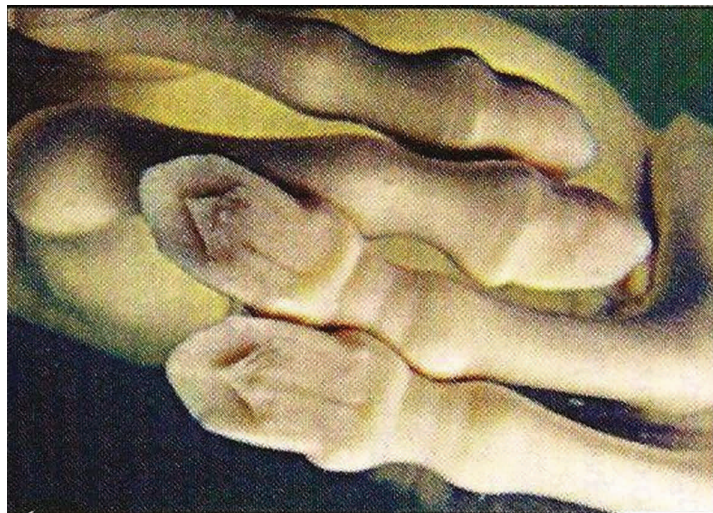
Right: You can see how cylindrical the donkey foal's feet are.



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When a foal is born, his hooves are fairly pointed. The fronts being a little bit more than the hinds. The pointed front feet aids in positioning and delivery through the birth canal. It also assists in the tearing of the placenta upon delivery. Once the foal is up and moving, the pointed feet become more of a liability. Movement on firm terrain is necessary to help with proper wear of the foal's hooves. Due to the hoof shape, the foal is unable to break directly over the front of the foot. This causes the flight path to break to either the outside or inside of the point. When unable to move enough on firm terrain this may cause the foal to become toed in or toed out. Neglect at this point allows additional wear during break over, contributing to additional deviations.



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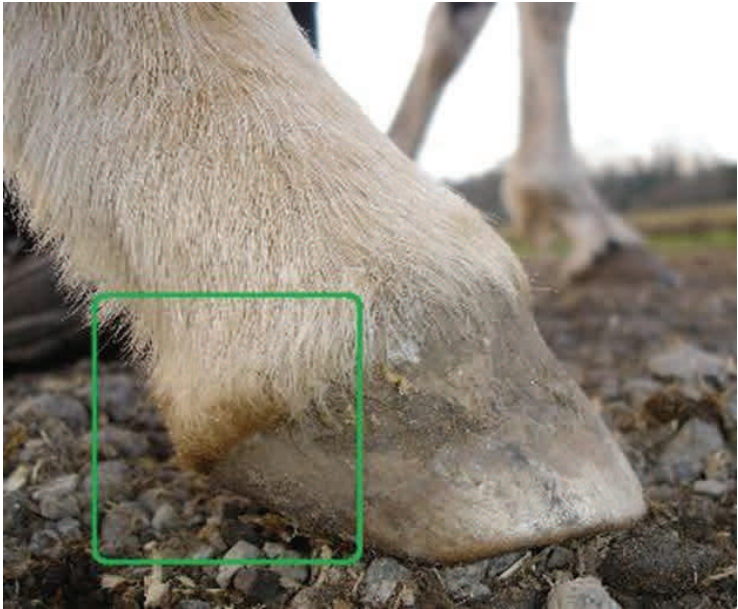


In the foal foot the coffin bone lacks a palmar process which develops as the horse grows. The coffin bone is not fully developed until the horse is mature. Dr. Robert Bowker, Professor of Anatomy and Director of the Equine Foot Laboratory at Michigan State Univ. College of Veterinary Medicine, has noted



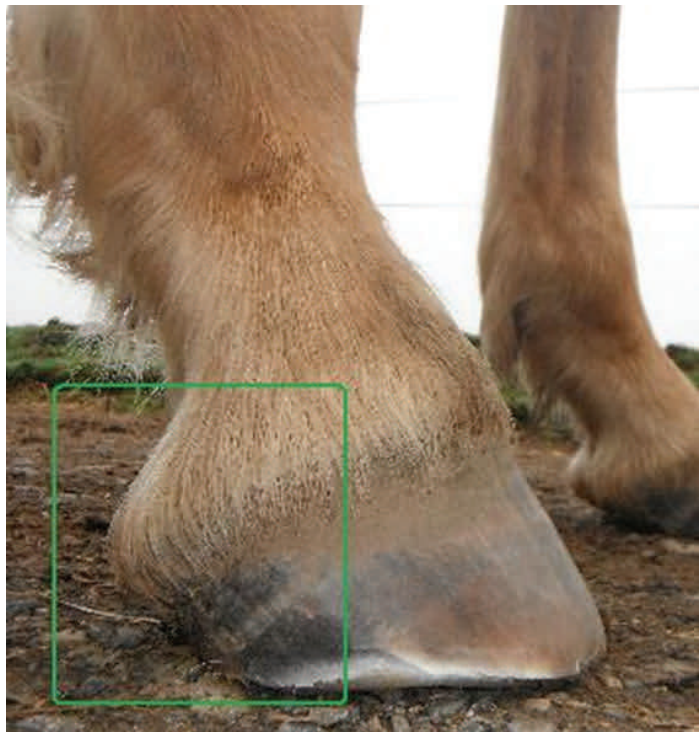
that the front and hind coffin bones of newborn foals are identical in shape. It is only after the foal bears weight and fulcrums over the front limbs during movement that the front coffin bones begin to transform to a more rounded shape. This difference between front and hind shapes can be observed by two weeks of age. Movement and activity are important factors in developing optimal coffin bone size and shape. Keep in mind that if the hoof is not constantly in use, it will develop to a sub-standard state.

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← 2 months

13 months →



The lateral cartilages at birth are also very small. The presence of the digital cushion at this stage of life is minimal, so the frog must perform the task of supporting the bone column. When a foal is born the digital cushion is a soft pad of fat. If the young horse has enough movement and good frog and sole pressure, the fat pad will become more and more fibrous, forming a strong healthy digital cushion.

Photo's and study was made by Julie Bailey and David Barrett.



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The foal will try to rise, stumble, and repeatedly fall. This activity is important for stretching muscles, straightening limbs, and developing coordination. More often than not a foal will move away from the birthing area before nursing. This achieves two things, 1<sup>st</sup> this removes the mare and foal from the area to which predators would be attracted. Secondly it stimulates the brain to foot connection though the proprioceptive nerves found in the feathery frog tissue, known as eponychium.

This colt is less than two hours old. His first walk was out of the shelter up the hill and back down again. All before nursing. A foal needs to begin walking on firm ground right away so that these nerve endings can get foot-to-brain communication working well. This early trek provides added benefits to the foal. It helps in development of



mental awareness, muscle coordination, proprioception, spinal alignment, and early changes in the hooves. The hooves undergo some very important changes during this first travel across sometimes rocky and abrasive ground. As the foal travels in his first hours of life the soft hoof wall rapidly wears off to meet the level of the sole. This places the frog on the ground which enables the frog to toughen and support the bony column.



The eponychium or Feathers or Gills as they are commonly called, make up the whole bottom of the hoof before walking. As the foal starts to move these feathers shrink and start showing the form of the bulbs and frog.

Newborn foal hoof before movement



Foal hoof after movement



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Here is a foal that obviously lives in a sandy environment. It is interesting to me to see how the eponychium is worn more up and out rather than flat like the foals living on less abrasive terrain.



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Below is a colt at a week and a half old showing the development of the bulbs and frog. You can just see a little bit of the eponychium at the apex of the frog.



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In soft footing, and especially in bedding, the feet just sink in without flexing or wearing. Foals can develop a contracted foot and/or under slung heels by not having firm ground.

Many breeders, in their attempt to provide the most secure environment for foaling, keep the mares and foals in deeply bedded stalls. Foals born during inclement weather or early in the year are sometimes confined to a small pen or stall several days or weeks after birth. These foals may miss that window of opportunity for optimal structural and hoof development. The hooves of foals confined to bedding or soft terrain, and subject to inactivity have been observed to undergo some potentially detrimental changes.

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So what are the 3 most important things for a foal to do?



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...out in all types of weather







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Also herd life with other horses is very important.





Not with big wooly sheep.



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Just like human babies, foals need their happy nappies too. Research shows foals up to 3 months old sleep about 12 hours in a 24 hour period.





All foals are slightly toed out when born, and straighten as they grow. Many are soft in their pasterns. Back to what I just said was important ... movement on firm terrain... will help to straighten a foal's legs.

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Above: Less than 24 hours old



Above: 10 days old

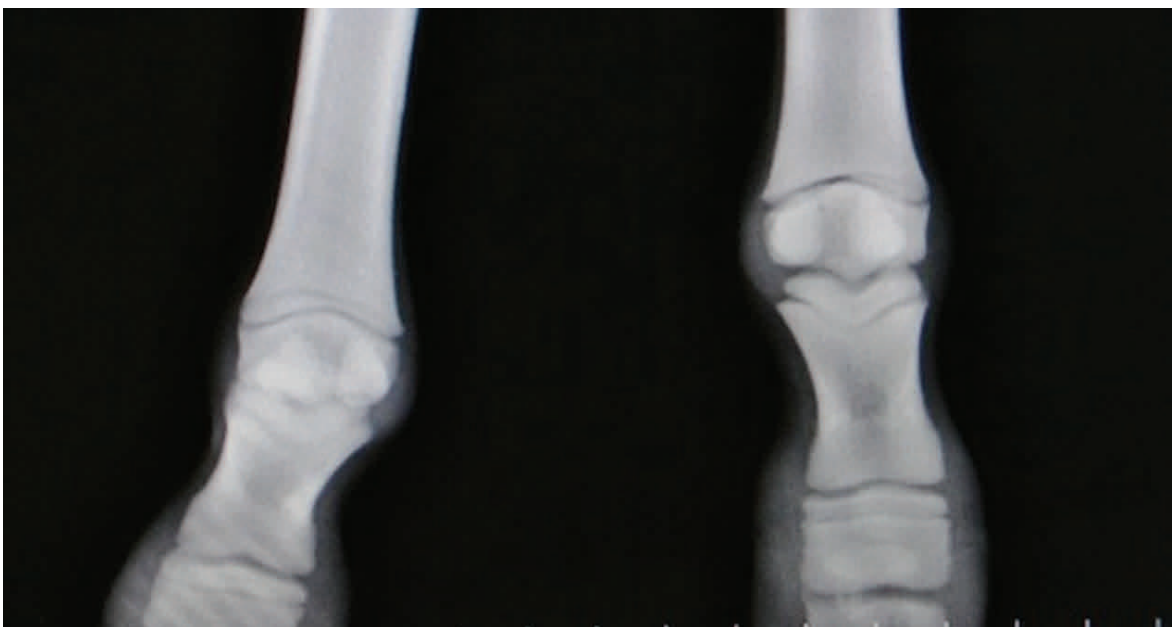
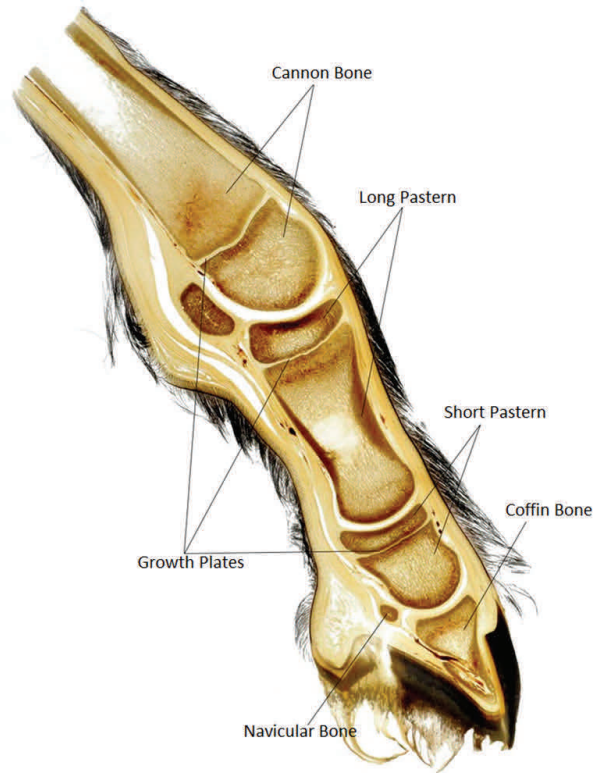


Growth plates are specialized areas within the bones of all mammals. Within the growth plate, there is a complex process going on called endochondral ossification, which involves the changing and maturing of cartilage cells and the replacement of cartilage by bone. By this process, the bones of the horse lengthen and the horse grows in height.

The epiphyses or growth plates are at the distal end of the cannon bone and at the proximal end of the short and long pastern bone. They stop growth in time intervals.

These intervals are around 3,6, and 9 months. The first being the most distal and the smallest, the short pastern bone stops growth at the epiphysis at around three months. The next is the long pastern bone at around six months and the Canon Bone at nine months.

The epiphysis determines the angular placement of the joint. If the foal's foot has a medial/lateral imbalance, the joints are not able to grow correctly, and leg distortion can occur. If a foal's foot is kept in balance with a proper trim and frequent schedule, the result should be that the limbs of the horse remain correct.



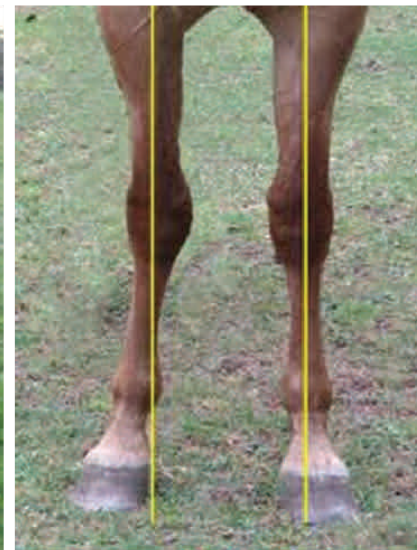
**Growth Plate - Closure Times**

Short Pastern Bone (P2)	3 mo.
Long Pastern Bone (P1)	6 mo.
Cannon Bone (M3)	9 mo.



We need to trim the foals feet balanced through the entire growth cycle of the epiphyses to ensure correct limbs. **To correctly balance ever so often will not be sufficient. The longer the joints remain unbalanced, the more out of balanced growth takes place in the bone. The short periods of balance achieved after a 6 – 8 weeks trim are not enough to correct the out of balanced growth.** This is so important I am going to repeat it. **To correctly balance ever so often will not be sufficient. The longer the joints remain unbalanced, the more out of balanced growth takes place in the bone. The short periods of balance achieved after a 6 – 8 weeks trim are not enough to correct the out of balanced growth.**

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Foals that do not live in an ideal setting of being out 24/7 on firm and variable terrain should be checked every two weeks for any imbalances in their hooves. Foals that live in more ideal settings still should be checked every 4 weeks throughout the entire growth cycle.

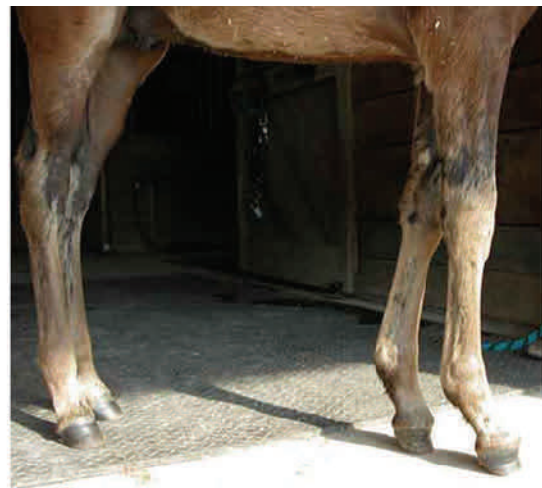
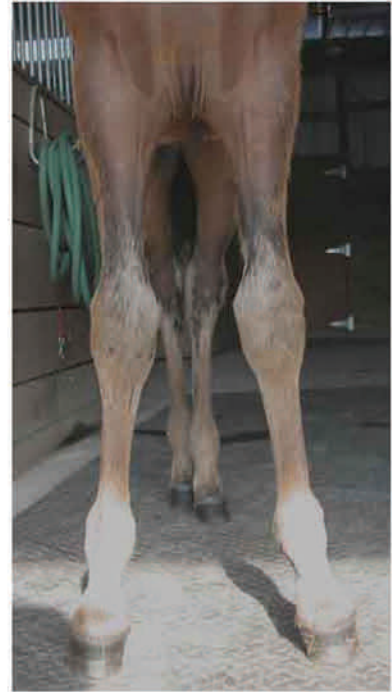


Foals grow rapidly, and so do their feet. From birth to six months foals will grow an entire new hoof from the coronary band down. He will never produce this much foot, this fast, the rest of his life. Your attention, or lack of attention, to this rapid growth may be the difference between a long trouble free life or a painful and expensive existence for your foal.

“All hoof and leg deviations from the ideal get worse with neglect of hooves and excess growth and can even become more deviated in their form and function.”

– Scott S. McKendrick, certified journeyman farrier

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Above: 2 month old foal



Jaxs at 5 months. This is a foal I have been trimming since he was 2 weeks old. The next 3 sets of pictures are of his left front foot.



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Left front at 2 months

Same foot at 4 months



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Same hoof at 9 months

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Same hoof at 2 months

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Foot from a 6 month old that is kept out side 24/7. He has never been stalled.

With trimming the very young foal, choice of tools to use would be the soft side of a hoof rasp or a sandpaper block. With the soft side of the rasp, it only takes a few strokes to trim a foal. A sandpaper block is good if you're afraid of trimming too much. The very first trim I like to use a sandpaper block, easier to handle with a wiggly foal. Plus first trim at 2 weeks there is not much to be done.





I like a field or a wide clean aisle way to trim the foal. I do like having an experience handler hold the foal. Best way to hold a very young foal is a hand around the neck and one under the tail. Having a third person holding the mare close is very helpful for both mama and baby.

Before you can trim a foal you have to teach it how to balance on three legs so you have at least a brief time to work. First trims are more about teaching the foal that handling his feet is a positive thing, rather than trimming too much. Keep things light.

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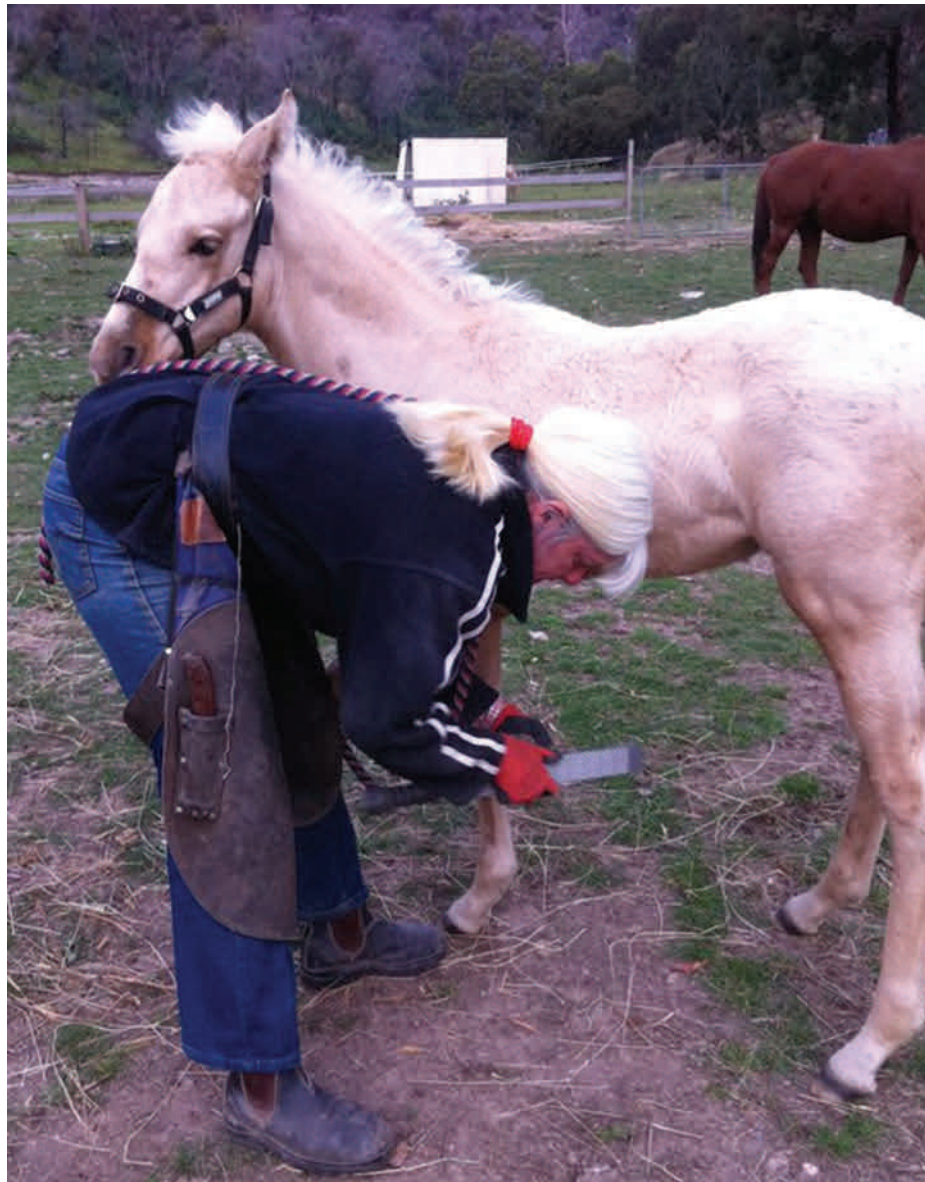
Keep in mind the growth plates in a foal's leg are delicate. It is important that no undue pressure is placed on the foal's bones while teaching the foal how to be restrained. Handle a foal's legs gently.

Trimmers should always hold a hoof in one hand and rasp with the other hand. Never hold the foot between your knees in a farrier's stance, to avoid twisting the joints.





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Be sure to set him up with the diagonal leg farthest away so he has a good tripod to stand on while you have the foot your working on in your hand. They learn quickly to set up if you show them how. Use a forward or backwards step so the diagonal foot is farthest out. You are teaching the foal to "move away from pressure" before you teach "pick up the foot". He will soon put the diagonal leg in a good spot when you start to ask for the leg you want. And then only trim a little and let him go.



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Your frame of mind is important. Stay calm and be very patient. I start with just running my hand down the foal's leg to get him used to me touching his legs. I don't stay long on the leg just a quick touch all the way down. After every touch give the foal a scratch. For foals, scratching is better than a food reward. When the foal is good with the touching I'll hold the fetlock with light pressure and ask for the foal to pick up his foot. Ask with

a light, steady touch, and release your touch immediately when the foal even thinks about responding. It may be just a shift of weight at first. Let him relax and think a moment, then ask again. This will quickly build into his understanding and doing what you want. Picking up a foot with your strength will be counterproductive in the long run. Much better to let the foal figure out what you're asking and make his own decision to help you. This gets a foal off to a good start for a lifetime of dealing with the people. After he lifts the foot, more scratches. Scratching him tells him "good job" and gives him a little break to think about what just happened.



Try to put the foot down before he has to take it from you, even if you didn't finish what you wanted to do. This way he is always successful in helping you, and gets rewarded by getting his foot back. It shows him you are willing to work with him and he will become willing to work with you



Many foals seem to prefer that you hold the foot high up near their body, rather than partway down to the ground as an adult horse generally prefers. I like to stand close with my body touching the foal's body, giving the foal support if needed.



Follow the foal's lead. If you are only able to do the fronts or hinds before the foal has had enough then quit on that. Know when to stop before you get into a fight.. There is always tomorrow to come back and work calmly on the other two feet. Pay attention and be patient.

Before I started trimming foals I asked my mentors "How do you trim a foal's foot?" The answer I got was "Like an adult horse." Which is true, but with foal feet keep in mind the lack of the palmar process, undeveloped lateral cartilages, and digital cushion. Remember the importance of a large supporting frog and movement needed to encourage the development of a strong functioning hoof. Keeping the foot trimmed, balanced and on a regular schedule so that the growth plates close in balance. Trimming at first mainly consist of shortening overgrown wall. The wall needs to be short enough to keep the frog on the ground, but not with excess pressure. Walls should be beveled lightly to keep splitting from happening. Soles are not trimmed early as they are thinner than in adult horses. Bars are only trimmed if they become too prominent. Frogs are not touched the first few months as they are needed for support of the bony column. Careful with rasping too much of the foal foot off



at the toe as this can contribute to a club foot development.



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