Proper Treatment of the Bare Hoof

Proper treatment of the bare hoof does not mean forcing it into a certain shape, but dressing it so as to allow the horse himself to gradually produce an optimal shape simply by its normal everyday usage. This is a process of "**self-healing**" through controlled horn abrasion.

As a rule, horses wear down their hooves unevenly. This may occur on the inside or outside hoof walls, in the toe or heel area or in any other part of the hoof, depending on the horse's individual constitution, outside conditions, and any given number of other relevant circumstances. If this one-sided horn abrasion is not corrected, the load will shift either onto one side of the hoof and/or onto the toes or heel of the hoof. This uneven load can easily be observed in the asymmetric hoof with differently slanted (long and later also high) side walls and different widths of hoof halves as seen from below. In these cases, the frog horn will also develop asymmetrically. If the load is on the toes, we will find narrow slanted hooves inclined to contraction, and if the load is on the heel, we will find hooves with an excessively pointed angle, a (backwards) broken pastern-toe axis and an inclination to sinking heels. Asymmetry of the horn capsule involves an asymmetric development of the coffin bone.
Hoof orthopaedics prevents this development by using an adjusted form of rasping to ensure even abrasion. If the horse is subject to uneven strain on its extremities, hoof orthopaedics corrects this in a way that enables the horse to literally „walk" its way out of an unhealthy situation. The basic concept here is to increase horn abrasion in less strained areas as well as using the counterpressure of the ground to shape the hoof. This allows the horse to utilise its own motion to restore its hoof balance.

In the light of hoof orthopaedics, the conventional way to even out slanted hooves by shortening them from below appears inappropriate. The immediate change in the mechanics of the horse's extremities ensueing from this

conventional type of treatment exposes the hinged joints, tendons and ligaments to a great deal of strain. Apart from the danger of spontaneous injuries, this also leads to degenerative phenomena such as side bone, ringbone and spavin diseaseto mention but a few. In contrast to the conventional way of hoof treatment where often one side of the bearing wall is shortened from below, hoof orthopaedics does not change the position of the hoof and the horse's extremities are not subjected to abrupt changes in strain, thus sparing the horse the detrimental effects described above.

Arguments against Iron Horseshoes

The use of iron horseshoes forfeits the natural elasticity of the horn capsule. The stiffness of the iron makes it absolutely impossible for the hoof to adjust to the ground the way a bare hoof does. Therefor the joints of the horse's leg are exposed to the roughness of the terrain without any means of shock protection. Without the elasticity of the bare hoof, the full impact of the hoof hitting the ground is transmitted to the hinged joints every time the horse puts its foot down.

Using iron horseshoes weakens the supply of blood to the living structures inside the hoof. Iron horseshoes only allow for a strictly limited flexibility of the horn capsule, although the full unhampered functionality of the so-called hoof mechanism is necessary for optimum blood circulation. This applies to a lesser degree to the widening of the hoof in the heel area, which is still possible to a limited extent if the iron horseshoe is correctly nailed on. More important here is the fact that the natural horn capsule is also twisted vertically when hitting the ground as described above – this kind of deformation is impossible with iron horseshoes.

Iron horseshoes deprive the horse of its sense of touch. A horse with bare hooves walks more carefully. It feels the ground and adjusts its gait accordingly in order to maintain the function of the legs. The iron horseshoe makes it

impossible for the horse to feel the ground. The hooves are desensitised and the horse uses its legs regardless of their needs. The funny thing is that many riders will feel more concerned about a horse that walks carefully over stones than about a horse that marches unhesitatingly over any kind of rough terrain – which will certainly ruin the horse's hooves, joints or legs eventually.

Iron horseshoes will gradually force the horse into an unphysiological position. For instance, shoeing with irons usually produces a flat position resulting from the disproportionally higher amount of horn abrasion in the heel area. It also contributes to a backwards broken hoof-pastern axis (see also our article on Sinking Heels. Iron horseshoes also increase the severity and the occurence of horses accidentally injuring each other

Sinking Heels (Underrun Heels)

The phenomenon of "sinking heels" occurs when the horse's extremities are improperly positioned, especially when the horse's hoof is too pointed. In this case, the hoof-pastern axis is broken. The main cause of this improper position is improper hoof treatment **(1)** or excessive horn abrasion in the heel area as can be found under iron horseshoes. Excessive in this context means substantial horn abrasion in the rear of the hoof while there is little or no abrasion in the toe area (under iron horseshoes). This uneven strain shifts the load into the heel area of the extremities when supporting the weight. Due to this lack of abrasion, the then overly long horn tubules of the toe wall are forced from their original position (where they cushion a great deal of the pressure from the ground vertically and only yield a fraction of it horizontally and outwards) to a position in which they increasingly give way horizontally to the pressure from the ground. This can be seen in bends of the horn wall, in widening and torn thin layers and in an excessively wide bearing surface in the toe area. In the extreme, the bearing wall can become almost unable to supportloads in the toe area. Since the toe wall then gives way in an outward motion every time the foot is put down, there is that much less abrasion in this area and the heel is subject to more and

more strain. Thus the horn tubules of the bearing wall change into an increasingly horizontal position in relation until eventually the toe is "runinng away" from the hoof.

The only way to correct this situation is to eliminate its causes. This means that the almost horizontal horn tubules have to be repositioned physiologically in relation to the ground. The hoof orthopaedist initiates correction by treating the excessively long toe wall tubules in a way that keeps them from acting as a lever. This is primarily done by correctly grating the hoof around the outside and thinning out the excessively wide bearing surface in the toe area. It is important here to grate high up along the hoof wall (avoiding a so called „bull's nose") in order to eliminate any outward leverage. This is called a „reed thatch structure", meaning that the outer horn tubules that were previously the longest and hardest will now become the shortest so that they stabilise the tubules underneath them, which keeps the toe wall from being bent outwards.

This has three positive effects at once: 1) the toe wall regains its bearing function, 2) there can be more abrasion in the toe area because the bearing surface is grated thinner (as described above), and 3) the leverage that causes the horse pain is eliminated, making it easier for the horse to put its foot down. Moreover, the horse will no longer relieve its toes by straining its heels. This means less load upon the heel so that the hoof can „walk itself back" into a balanced situation.

(1) e.g. a constant shortening of the heels – as widely propagated by a well-known school of bare hoof care – often causes this type of positioning.

Fissures and Horn Cracks

Fissures and horn cracks are caused by shearing forces **(1)** when horses place unequal load on their hooves. They are separations along the horn tubules that commence when the horn starts to crack due to tension in the hoof. These

separations develop in the toe or side wall of the hoof or in the rear area of the bar according to the specific asymmetrical shape of the extremities. The cracks generally open up between the steeper and the more slanted parts of the hoof wall. Cracks in these areas are caused by the different forces exerted by lifting up and putting down the foot. While the steeper parts of the hoof wall are subject to an upward force due to the pressure from the ground, the more slanted parts of the hoof wall are leveraged outwards (and inwards with superslanted walls). Even if the hoof is very long so that abrasion is not a problem, it is in danger of developing fatigue cracks that could turn into horn cracks lateron. In general, it can be stated that the greater the asymmetry of the extremities and the longer the tubular horn of the bearing wall, the greater the leverage forces and therefore the danger of fissures and horn cracks developing in the horn capsule.

The only way to prevent or treat this phenomenon is to eliminate the uneven load. Grating those parts of the wall that are less subject to strain in order to control horn abrasion ensures that they are run off just as quickly as those under great strain. Slanted side, bearing and toe walls bent outwards are corrected from the outside to reduce the bending forces on them. The hoof wall is grated as high as possible in the area of the horn cracks to shorten the especially long and stable exterior tubules since it exerts the greatest spreading on the horn cracks. Lying bars are cut back while bulged sole horn that forces the horn of the heel wall outwards is removed.

As soon as this strain is equalised, the horn cracks will start to disappear. However, regardless of the amount of horn and quality of the hooves, all therapy should be geared towards treating the causes of horn cracks. If they are not the result of an injury, fissures and horn cracks in the hoof horn should alarm the owner to the fact that the horse's extremities are suffering from an extremely detrimental strain situation. Using the conventional aids such as special horseshoes, horn substitutes, tapes or the ever-popular transverse grating will

have no effect whatsoever on the causes. Even if they temporarily stabilise the situation, they cannot solve the orthopaedic problem that causes this major problem. The damage to the horse is not eliminated, but exacerbated due to the fact that it continues to exist.

(1) with the exception of defects of the horn wall resulting from injuries (for example, injuries in the coronet)

Iron or Plastic – Is That Really the Question?

People have been using iron horseshoes on horses for centuries. This was originally conceived as a form of protection against hoof abrasion for horses doing hard work each and every day. Nowadays, irons have become a perfectly normal thing, although they are actually quite inappropriate to the way horses are usually employed. In the age of horseback riding for pleasure, horses spend the better part of their days dosing, mostly standing in hay-filled boxes, on paddocks lined with rubber or filled with chipped wood, or feeding away on lush green meadows. Plus they enjoy a couple of afternoons per week going out for rides that only last a few hours. At the most they are prepared for competitions on weekends that take place in halls and riding court sands. Still, most horse owners today think that iron horseshoes are necessary. Why should that be so?

The age-old tradition according to which horses‘ hooves are commonly trimmed and shod has led to an actual situation where many horses are unable to walk without the aid of iron horseshoes. But isn't it insane to treat the hoof by depriving it of its natural protection – namely the bearing wall – and then nail on an artificial one? And isn't it just as insane to trim any hoof that doesn’t fit this scheme into an "ideal" form – with all of the negative consequences for tendons, ligaments and joints? Wouldn't it be better to treat the hoof in such a way that it doesn't lose its optimum shape? In that way, with an arched sole, proper bearing walls and an evenly distributed load, it will be fit for walking without those all too common „crutches“!

Although many still believe that horseshoes are absolutely necessary, more and more people in the last decades have recognised the fact that the iron horseshoe produces a vast range of negative consequences that could rightfully be addressed as a syndrome. Today, horse owners no longer believe that iron horseshoes are necessary, but rather cinsider them a necessary evil. With a growing awareness of the detrimental effects of iron horseshoes, people have begun to search for other materials in order to avoid these effects. That is how plastic horseshoes were invented. Plastic has many advatages over iron, mainly because the elastic material eliminates the radical restriction of hoof mechanics that comes with the use of iron. Hoof mechanics in our understanding does not mean a "widening" of the horn capsule and a "lowering" of the sole, as has been described as "hoof mechanism" up to now (which is, in our opinion, neither sufficient nor comprehensive). In our understanding the term should circumscribe the diverse possibilities of twisting and forming of the horn capsule in motion (the precise and detailed description of which would be too lengthy here).

The benefits of the new plastic horseshoes in relation to the old iron ones can be described as follows:

(1) In contrast to shoeing with iron, shoeing with plastic does not deprive the horn capsule of its elasticity. This means that the hoof with a plastic horseshoe can "embrace" the ground just just the way a bare hoof does. This embrace grants the joints of the horse's leg the best possible protection from wear and tear and injury. Iron is rigid, meaning that the horn capsule cannot adapt its shape to the base. Therefore, the joints are exposed to the uneven ground without protection. Without the elastic agility of the bare hoof, every time the horse puts its hoof on the ground unevenly the impact is immediately transmitted to the hinged joints, which can be the direct cause of injuries.

Moreover, many malfunctions and disorders of tendons, ligaments and joints can be traced back to the detrimental effects of iron horseshoes.

(2) Another benefit of the elasticity of plastic in comparison to the iron horseshoe is the fact that the hoof's blood circulation is not restricted. The fact that the natural horn capsule can continually and freely change shape ensures excellent circulation. It goes without saying that this circulation also supplies the hoof's "inner organs".

(3) The elastic horseshoe also allows the horse to maintain a natural capability of self-protection, namely the sense of touch that every unshod hoof posesses. Plastic gives the horse this same ability to feel the ground under its feet. For this reason, a horse with plastic horseshoes is much more careful with its legs than a horse with iron horseshoes. It adapts its gait to the ground and searches for a path that goes easy on its extremities, all of which serves to maintain itself intact and functioning. The iron horseshoe deprives the horse of its sense of touch; the iron switches off the horse's feeling, and the hooves are desensitised. This encourages the horse to be reckless with its legs. Of course, not everyone believes the horse should have this sensitivity, and some even think that it is a drawback of the plastic horseshoe. Many riders feel that an intact sense of touch disturbs their riding pleasure or casts doubts on their equestrian capabilities; many others, however, prefer a horse that feels its way over rough and stony ground.In that way they need not worry about the horse ruining its legs in the short or long run – which would inevitably be the case if they let it march unhesitatingly over any type of terrain.

(4) Furthermore, the plastic horseshoe is better than the iron one since it does excellently what it is actually supposed to do, namely protect the hoof horn. In contrast to iron, there is no horn abrasion with plastic horseshoes. They also eliminate the negative consequences of the iron horseshoe due to the disproportional horn abrasion on the bearing surface. Uneven horn abrasion with

iron frequently produces a flat position and therefore a broken hoof-pastern axis. This increases the load on the navicular bone and therefore also the proneness to navicular disease.

(5) Finally, let us not forget a key benefit of plastic in relation to iron, namely that horses with plastic horseshoes are not a danger for members of their own species. Since mutual injuries among horses are no more serious with plastics than with bare hooves, horses with plastic horseshoes are not condemned to solitary confinement as horses with iron horseshoes often are.

As could be shown, plastic horseshoes have important benefits over the traditional iron horseshoes if the comparison is made with the horse‘s health in mind. However, one drawback of plastic horseshoes should not be omitted –due to the complete lack of horn abrasion under this type of shoe, it has to be renewed more often. This means that it has to be nailed on more frequently and therefore the hoof horn is subject to greater damage by being perforated with nails. However, this is usually not the reason why people often reject plastic horseshoes. Most important here is surely the fact that horses with plastic horseshoes do not walk as they do with iron horseshoes. As described above, plastic shod horses feel the ground, which many riders perceive as unpleasant and disturbing. Another reason why many people reject plastic is the fact that they are unfamiliar with this entirely new material.

But then it should be remembered why horseshoes were used in the first place. The actual reason was preventing horn abrasion, which is also the only intelligent (and intelligible!) reason for this or any other form of hoof protection. Also, as we have seen at the beginning of this article, today‘s leisure-time and athletic horses can come to terms very well with their hoof horn considering their usage and the often abrasion-friendly bases they move on. This means that all forms of permanent hoof horn protection are obsolete. Of course, during times where horses are subject to intensive use such as hikes and long rides, or the training

phases necessary for those ends, this can be compensated with "plastic weeks". In these cases, horseshoes definitely make sense. However, there is no doubt that plastic horseshoes are much more appropriate considering the horse's health.

Naturally, many people have different attitudes towards horseshoes. The reason for using horseshoes, as everyone knows, has nothing to do with excessive horn abrasion that would restrict the use of the horse, but rather with the belief that some horses would be completely unable to walk without horseshoes. But if this is really the case, then they should not be forced to walk albeit with horseshoes. Then the right thing to do would be to heal the hooves as the foundation for the extremities of the horse, i.e. to restore their functionality. This is no less difficult, but it makes much more sense than concealing and prolonging the problems over years with compensatory and repair work. Of course, asymmetric, deformed and unevenly loaded hooves have to be treated properly and adequately in order to restore their most efficient condition. Horseshoes that only compensate for asymmetries will certainly never achieve this aim.

We call for treating hooves in a fashion that maintains the horse's well-being. Horses with sound hooves can be shod without endangering the horse's health if plastic is used. However, healthy hooves generally do not need shoeing in the first place .

The Contracted Hoof

One-sided contracted hoof (spread contracted hoof) is caused by the extremities being strained on one side. If substantial one-sided horn abrasion of the inside or outside wall of the hoof is not corrected, the load will be shifted onto that half of the hoof. The greater horn loss causes the bearing surface to be shortened faster on that side than on the opposite side not subject to this strain. This means that the hoof is lower on that side. At the same time, the opposite side of the hoof leverages the hoof upwards on the other side, thus shifting a proportionally

greater amount of weight onto the side wall subject to strain. However, that side is already too low and suffers under a greater load. This puts the lower wall in a steep position in relation to the ground, preventing the side wall from being outwardly resilient under load and making the side of the hoof tend to get narrower (under load).

Hoof orthopaedics corrects one-sided contracted hoof by counteracting uneven horn abrasion. Abrasion is increased on the side of the hoof with a lesser load in order to restore balance. One way to do this is to thin out the bearing wall on this side so that it offers less abrasion resistance towards the ground and will be able to wear faster.

Double-sided contracted hoof generally develops in connection with narrow steep hooves and is always the result of a lack of or improper treatment. The horn capsule and in particular the rear section of the hoof is hardly subject to any widening from the counterpressure from the ground due to the steep straight bearing walls that narrow hooves have. If the hoof is left untreated or treated improperly, the opposite may develop, namely inner leverage. The rear parts of the side walls that are in a vertical position in relation to the ground develop into "supersteep" walls such as the heel walls and they are increasingly shaped in the inward direction under the pressure from the ground. This is caused by the rear hoof area being subject to a lesser load. There may also be less of a load if the hoof is improperly positioned (acquired tendon contracture or club foot) and due to pathological changes in the area of the navicular bone (navicular disease). The hoof becomes increasingly steep and narrow due to the reduced load on the heel involved with these processes and the horn abrasion in the area of the toe wall is increases accordingly.

Overloading the rear section of the hoof may turn narrow individual hooves into contracted hoofs. This development is also due to improper or lacking hoof treatment. An example of this is excessive abrasion on the heels under iron

horseshoes combined with excessive shortening of the heel area (when trying to cut the hoof to a certain shape that the owner imagines to be ideal). This may transfer an excessive a load onto the rear areas of the hoof. This forces the bearing horn tubules (that are already supersteep in relation to the ground in narrow hooves) inwards due to the increased load from the counterpressure from the ground. The toe wall has a more slanted angle to the ground by tilting the hoof backwards, meaning that the bearing surface becomes wider. A more slanted angle and higher width slow down horn abrasion in this area. The horn tubules in the toe wall and in the area of the edge of the sole wear down less than the horn structures in the rear area of the hoof. The abrasion in the area of heels under more and more pressure increases on a similar scale. In addition, the narrowing of the central and collateral grooves also favours the settlement of putrefactive bacteria and the development of thrush. The maceration of the frog horn (and often also that of the ball horn) makes the hoof even narrower.

The main work of hoof orthopaedics is geared towards minimising the imbalanced load. The procedure depends upon the specific situation. If the rear sections of the hoof are overloaded as described above, the hoof treatment will be aligned towards distributing the load in the direction of the toe. In contrast, if contracted hoof is caused by a lesser load in the rear of the hoof, hoof orthopaedics thins out the bearing surface in the heel area and rear side wall area to attempt to ensure that the hoof receives more abrasion in spite of a lower load in the heel area. This and other work also prevents improperly positioned (acquired tendon contracture or club foot) or unhealthy extremities (navicular disease) from becoming more and more steep in the rear due to less abrasion.