

Experiences in the Healing of Difficult Bone Fractures

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Summary:

During my activity as a hoof specialist, I was also able to gather several experiences in the treatment of broken bones in the limbs. The process of healing will be demonstrated with three different examples:

1. a complete humerus fracture in a young foal (remote consultation);
2. a complicated hock fracture in a 21-year-old horse; and
3. fractures of both hind coffin bones in a yearling (remote consultation).

My treatment and advice in these cases followed the same principles of histology as with hoof treatments: healing demands optimal circulation, which in the horse is only possible with constant movement and psychological balance. Thus optimal living conditions are a prerequisite for complicated healing processes.

Case 1: Humerus fracture in a foal

In April 2006, a 3 month old foal was found unable to get up due to acute lameness in the right shoulder. The penniless owner helped the foal up, and it limped off on three legs to follow its mother. After a consultation with the author, x-rays were taken. These showed a diagonal fracture of the humerus in the distal third with compression (ie overlapping) of the fractured ends, with the result that the distance between the shoulder and the elbow joint was only about 2/3rds of the original, physiologically correct humerus length.



Fig. 1

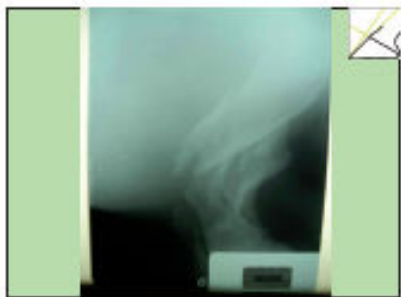


Fig. 2



Fig.3

An operation was, due to the cost factor, not an option; and in any case, the third day after the accident was too late for this. Local veterinarians recommended euthanasia, but the owner was unwilling to agree to this. Another conversation with the author ensued. After a discussion about the possibilities available on the owner's land, the author recommended providing the foal with unlimited opportunity to move, and building a „swimming pool“ for the foal so that it could move its limbs under as little loading as possible. The owner followed this advice. In the following weeks, there was at first considerable swelling of the upper arm and elbow area (Fig. 3).



Fig. 4

The foal moved in a lively manner and tried to move the broken limb, even though it could not bear weight on it (Fig 4). The distal displacement of the elbow due to the fracture caused a marked „lengthening“ of the limb. In June, 2 months after the accident, the „swimming pool“ was finished. Every day, the foal was led into it and moved around in circles for about half an hour. The procedure brought astonishing results: after each swim, the shape of the upper part of the limb and the length of the leg seemed to be more physiologically correct than before (Fig. 5). Its movements, too, were more „normal“ than earlier in the same day, before the pool exercise.



Fig 5

Aside from the „swim training“, the foal was also led in straight lines several times a day for 15 minutes. In addition to this, it had complete freedom of movement with its mother, and – in typical foal fashion – it made full use of this. The stability of the damaged limb increased from month to month, movements grew more harmonious, and over time the right limb's length once again fit the whole organism. In October, the situation was markedly better than in June (Fig. 6).



Fig. 6



Fig. 7

The situation developed in a steadily positive fashion. In December 2007, about 1 ½ years after the accident, the shoulder had gained a normal angle, but the upper arm still seemed too short.



Fig. 8

In 2009, no deviation was detectable in movement, or visible physically in the shoulder/upper arm region. In January 2010, more x-rays were taken, before the decision was made to begin systematically training this now almost 4-year-old horse. In the presentation, the photos are supported by several video sequences.
Dr. med. vet. Hiltrud Strasser, June 2010

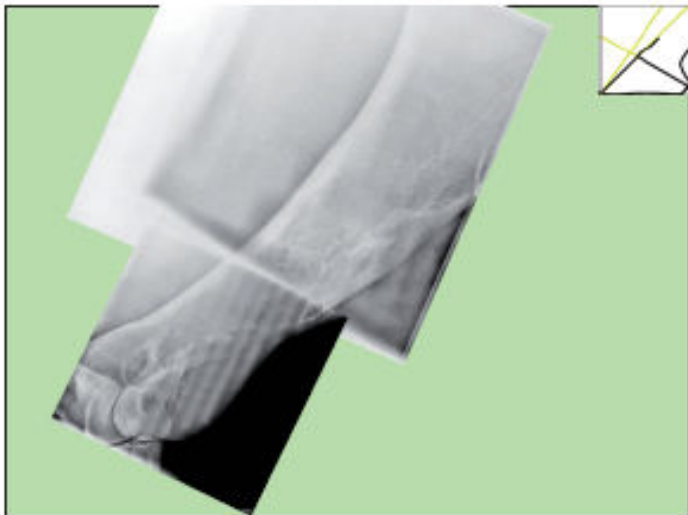


Fig. 10

Case 2: Tarsal joint fracture in a 21-year-old horse

Description:

The horse was brought to the author's hoof clinic in Tuebingen on September 30, 2009, against the orders of the local veterinarian from the horse's home region to euthanise it immediately.

X-rays showed a complicated hock fracture (Fig 2) of the left hind leg.



Fig. 1



Fig. 2

The leg was extremely sensitive to pressure, tension and movement. The hoof was only set down when the horse was standing, and then only very slowly and carefully, and only with the toe (Fig 1).

Treatment was decided from the following underlying considerations:

The regeneration of defective bone will begin with the formation of callus, that is, with the connective tissue stabilisation of the whole joint. Because of this, the joint will, initially, lose its mobility. The more the horse moves quietly, the better the circulation will be even in the damaged leg, and the better the healing process will progress. The regeneration of all involved and eventually damaged tissues in the hock requires orientation as to which direction loadbearing occurs.

This is why the horse should put some weight onto the hoof as soon as possible. At first, the horse only used the right hind leg, so there is little movement of the hoof, and as such little pumping effect on the blood vessels. This results in swelling, and to address this problem, we massaged hirudoid salve into the weightbearing hind leg below the hock several times a day. This reduced the swelling considerably, and kept it to a minimum.

In order to gain an impression of the overall condition of the horse, pulse and respiration were measured twice a day during the first 2 months. In the first 6 weeks, these values were still in excess of 80 (pulse) and around 50 (respiration), but they normalised during the 3rd month. Pulse and respiration are indicators of whether an animal is in pain. The more these values normalized, the more the damaged limb was also being used.

Swelling of the sick limb increased in the first 4 weeks, ie the callus was developing markedly (Fig. 3).



Fig. 3

The horse was moved slowly several times a day on the elastic rubber floor of the hoof clinic. The healthy as well as the sick limb were massaged with Tensolvat (a hirudoid-containing solution). With this animal there was the added complication of a nerve problem in the ileo-sacral region: the damaged limb was pulled up jerkily and was not brought forward smoothly and parallel to the body centerline. This problem could be managed with massage and spine lengthening work (tail pull). In the long term, we recommended physiotherapy and neural therapy.

A video clip shows the horse's movement 4 months after the accident: the damaged limb was being fully weighted at the walk. From this we can conclude that the horse no longer has notable pain. The x-rays before release show the clear stabilisation of the individual structures (Fig 4).

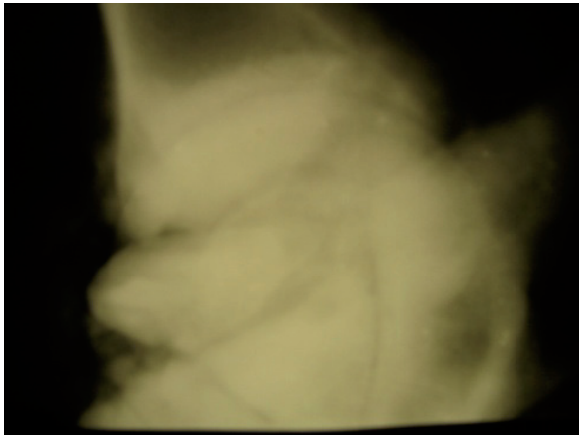


Fig. 5

We were worried about the right hind hoof, the one which was weightbearing during the healing. We could not trim it for about 3 months, since the horse would not lie down and it could not hold the leg up. Only after about 3 months were we able to lift the hoof and work on it. Fortunately, no new problem had developed.

Discussion:

We rightfully consider this healing process a success, since the horse could walk and load this limb without pain in the reasonable time period of 4 months. The problem with this kind of joint fracture is that the many small joint capsules do not regenerate with sufficient flexibility to immediately allow the full range of motion of the joint. It will take several more months with daily massage and movement on firm ground to make the hock flexible enough for its full range of motion.

Case 3: Coffin bone fracture in both hind hooves of a yearling

Description:

In Lettland, a yearling which had always had extremely steep hind hooves (Fig 1) was suddenly found to be acutely lame. Evaluation via x-rays showed that in both hind hooves, the distal half of the coffin bone was broken off (Fig 2).

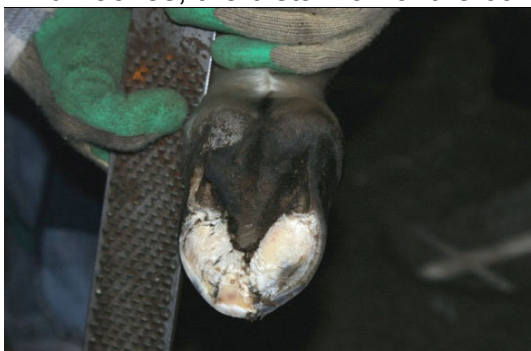


Fig. 1

The examining veterinarian from the veterinary faculty at the University of Riga urgently recommended the immediate euthanasia of the yearling. The animal was very careful with bearing weight on its hind limbs, but it moved and was interested in feed and wanted to follow its mother – which means there was a will to live, and the pain was obviously less than its survival instinct.



Fig 2

Considering these circumstances, the owners did not want to just give up, and at least wanted a second opinion. This is why they contacted the author. Since several positive experiences with bone fractures already existed, the author advised giving the foal freedom of movement on even terrain, and to regularly trim the hooves into physiologically correct form and provide daily hoof baths.

The owners followed her recommendations. Half a year later, x-rays were taken again (Fig 3). On them, it was clearly visible that the broken-off coffin bone tips had not been resorbed, but had obviously grown together with the main part of the coffin bones.



Fig. 3

At this time the foal moved normally at the walk, but it did not like to trot. The external hoof form corresponded to that of a 1 ½ year old horse. After the owners attended a three-day hoof seminar and received personal instruction by the author, the hooves were trimmed into a more physiologically correct form (Fig 4 and 5).



Fig 4 and 5

After a visit by the author, the recommendations from March 2009 continued to be followed fully, since the development had, contrary to expectation, proceeded so positively.

In February 2010, more x-rays were taken (Fig 6).



Fig.6

The author gave new advice for the correction of the hoof form, which led to the horse moving more, and moving more happily. Through repeated correction of the hoof form via photo consultations and trimming advice, the hooves remained in physiologically correct shape.

The x-rays 11 months after the accident (Fig 7) show good adhesion of the broken-off coffin bone tips with the coffin bone. The alignment of the short pastern bones with the coffin bone is almost physiologically correct. The short pastern bones are beginning to be broken down dorsally to allow a physiological placement of the extensor tendon. The palmar processes are beginning to grow, but in the original direction of the „clubfoot“. This causes the navicular bone to be pushed too far upward.

But overall, the hooves developed amazingly well, and this continued over the next several months, as the x-rays of May 2010 prove (Fig 7).



Fig, 7

Discussion:

The owners of the foal have no explanation for what caused the broken off coffin bone tips.

At the time of the „accident“ (?) the foal was being kept with its mother in a box stall. It is possible that the mare stepped on its foal's hooves while it was lying down, which could have caused the fractures. When the foal tried to get up, the fragments were displaced toward the front. There is no other explanation.

The amazing thing is that the broken-off coffin bone tips obviously remained connected with the laminar corium of their originating bones and continued to be supplied with nutrients. It is incomprehensible how loose coffin bone tips could reconnect and grow back onto an area which is covered by laminar corium. The author will attempt to acquire cadaver foal hooves to examine this situation more closely. It would be an interesting consideration to be able to use such fractures as a corrective method for older (over 1 year) clubfooted foals.

Case 4: multiple coffin bone fracture (case from Sheri Fischer, USA)

A 14 year old mare with a diagnosis of “coffin bone fracture with joint involvement, hind left” was brought to the hoof clinic of the Fischer Equine Lameness Foundation in Minnesota, USA, owned by SHP course graduate Sheri Fischer. The accompanying Xrays showed ossifications around the pastern joint and multiple fractures of the coffin bone (Fig 1-3). Movement was stiff and difficult.

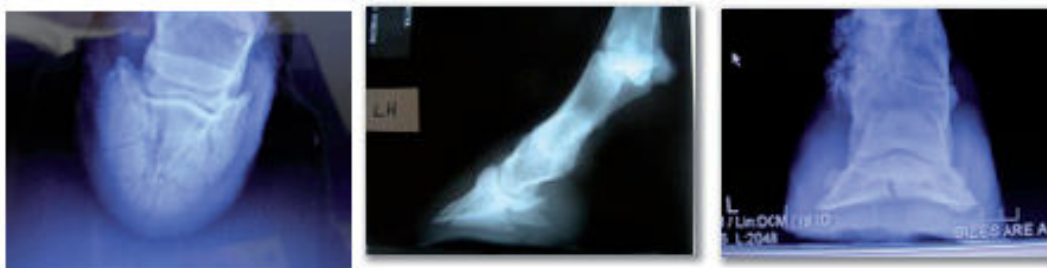


Fig. 1-3

10 months later, the ossifications around the pastern joint were reduced and the coffin bone fractures had healed well. X-rays taken 10 months after admission into the clinic show this clearly (Fig 4-6).

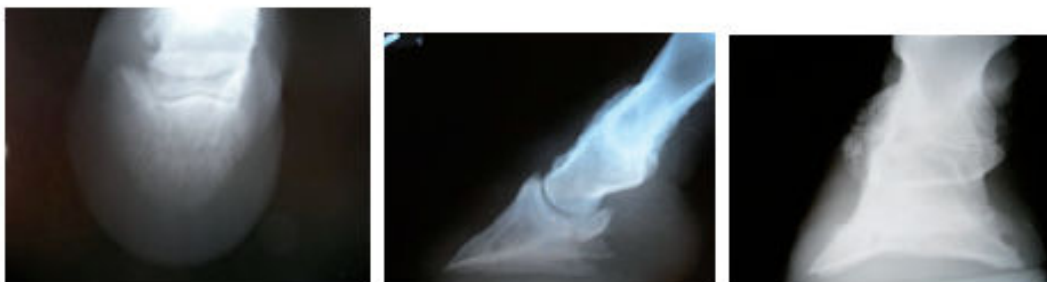


Fig. 4-6

More information about this case can be obtained from Sheri Fischer of the Fischer Equine Lameness Foundation in Minnesota, who kindly shared this file with us. See also her website, www.healthehoof.com.

Conclusion:

It is the opinion of the author that universities should conduct research in the area of the natural healing processes involved in bone fractures, instead of using unnatural medical practices which do not lead to success and thus prove „incurability“.