

# Hoof Wall Resection and Reconstruction for a Tubular Defect

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## History:

A 15-year-old 15-hand Connemara mare had a history of infections in the dorso-lateral (outside toe quarter) aspect of the sole. Abscesses recurred every few months.

The white line in the region eventually deviated inward, forming a loop around the infection site (see photo 1). The farrier had suggested a few months previously that the horse might need veterinary care.

After the latest infection the owner decided to consult a veterinary surgeon. Radiographs revealed an unusual U-shape at the fringe of the dorsal aspect of the P3.

## Day 1 Treatment

The site was excavated beyond the area of the under-run sole, cutting the outer wall towards the coronary band following the 'sinus'.

This revealed a fibrous tube that looked like a worm in the foot. It extended the full height of the wall (see photo 2). This

"worm" was removed skillfully by the veterinary surgeon without causing much bleeding (see photo 3). It was embedded within a groove formed in P-III but it was separate from the sensitive laminae.

It was hoped that by removing the substance, new horn growth would not regenerate another core and further irritation to the area.

An Imprint thermoplastic shoe was fitted to the trimmed foot to stabilize the resected hoof. The void where the substance was removed was to be rebuilt when the underlying tissue had granulated (see photo 4 and 6), possibly in ten days to two weeks.

Once satisfied with the fit, the shoe was rapidly cooled using the Imprint shoe freezer, which solidifies the shoe prior to curing of the adhesive. The foot was then placed on the ground; the total time of the shoe fitting procedure took less than five minutes.

Two small, blunt-ended self-tapping screws were placed in the shoe prior to fitting to aid grip (traction) on smooth concrete (see photo 5).

An iodine and sugar (Sugardyne) solution was applied to the resected hoof as an effective antiseptic dressing.

Immediately, the mare walked comfortably.

## Day 2 to Day 13: Stall Rest

The mare was stabled and walked out in-hand daily.



## Day 14

The resected site was inspected again; it was hard and dry.

A number (three or four) of bulb shapes were routed out of the sides of the excavation, effecting a jigsaw keying interdigitation (see photo 6) to hold reconstruction material. This created a much larger surface area of bond as well as a mechanical attachment. It also resisted vertical shear forces.

Surgical spirit was used to clean the area, and then Keratex wax putty was formed into the groove below the level of the horn to prevent pressure or irritation from the filling.

A thin layer of Imprint structural adhesive was applied. Then some softened Imprint thermoplastic granules were formed into the fault filling it completely, not overlapping the edges but slightly proud, (see photo 7) as when cooled there is slight shrinkage. The second stage of the procedure was complete.

## Day 60

A pair of Imprint shoes were fitted to enable the mare to do road work.

## Day 90

The horse remained sound and was in regular work on the road and in an outdoor ménage, still wearing Imprint shoes. She was turned out in a wet field and stabled at night.

The reconstruction site needed no further maintenance and was rapidly growing out. At eight weeks after the initial treatment, it had grown more than one-third of the depth of the foot.

It was suggested that a second set of heartbars may be needed, and then a return to conventional steel shoes with side clips.

## Conclusion

The maximum support of the heartbar shoe was ideal to give base support. The flexing 'W' bar mimicked the anatomy and allowed for the natural function of the foot while the flange gently contained the weakened area.

Although the erosion to P-III is irreversible, as long as further irritation doesn't occur, the treatment was a success.

Without the owner, veterinary surgeon and farrier co-operating together this work would not have been possible.

The procedure was simple, clean and non-traumatic to the hoof wall, sole, or horse.

The decision to use thermoplastics as a reconstruction material was made because it appears to have the closest

properties to hoof horn of any products available. It holds its form when molding, and there is no exotherm (heat given off) when hardening. Its maximum temperature at outset is 60°C (140°F); it cools thereafter. It is highly resilient, will withstand high concussion, will take nailing, and it is a quick, low cost repair, low risk choice, since it is both bio degradable and non-toxic (environmentally friendly).

Such a successful procedure is fulfilling for the farrier and conducive to promoting the profession--and helpful for the horse!

## STEPS IN APPLYING THE SHOE

Using a 4mm router tool three oval indentations, about 6mm x 12mm (1/4" x 1/2") horizontally and 6mm (1/4") deep, were made in each side of the hoof wall just above the ground. These provided dovetail keying or interdigitation for the thermoplastic flange of the Imprint shoe.

The foot was cleaned with surgical spirit to kill any bacteria prior to applying the shoe, preventing anaerobic bacterial degradation of the horn.

A small plug of Keratex wax putty was molded into the base of the defect in the sole and covered with cling (plastic wrap) film.

The Imprint thermoplastic heartbar shoe was heated in hot water to soften the foot mating parts only. The material softens at 60°C (140°F) and becomes clear and malleable. The softened shoe was taken from the hot water.

A sparing amount of Imprint structural adhesive was applied to the heel foot surface of the shoe and around the inner face of the flange ("cuff") only. The adhesive will tolerate moisture and still work.

The shoe was swiftly offered up to the foot, using the center of frog as the datum (reference point).

The peripheral flange (cuff) was molded to the exact form of the foot. Material was formed into the oval indentations made by the router, and into the base of the resected hoof.

The heels of the shoe were blended up to mate with the hoof. The frog plate contacted and made an imprint of the frog, and the toe of the shoe was checked for adequate seating.

