

Final Report

CHINA ROCK

22nd March 2011

to

3rd August 2011



CHINA ROCK

RE: Clinical and Ultrasound Report Background

China Rock, ran in the Cheltenham Gold Cup on Friday 18th March 2011. He was pulled up by the jockey who noticed a dramatic change in the horse's action three fences from completing the race. It was reported that it was immediately evident that he had sustained a right fore limb internal tendon injury. I understand this horse has no previous history of tendon problems.

Following on-course first-aid of heavy support bandaging and pain management he was transferred to Jackdaws Castle racing yard a short distance from the racecourse. He travelled to the Tendonology treatment centre in Kent on Tuesday 22nd March 2011.

Clinical Examination 22nd March 2011

China Rock arrived with a heavily bandaged distal right fore limb and a more lightly bandaged left fore limb. Removal of the bandaging on the right fore limb revealed the following:

- Diffuse and significant soft-tissue swelling in the area of the digital flexor tendons and suspensory ligament. This is shown in figure one
- A loss of delineation of any of the soft-tissue structures on the posterior lower limb below the carpus region
- An engorged, puffy and hot superficial digital flexor tendon (SDFT)
- A golf ball sized soft-tissue swelling, 4 cm above the fetlock joint, on the anterior aspect of the distal fore limb. This is shown by the arrow in figure two.



Left

Figure 1: Diffuse soft-tissue swelling of the distal right fore limb



Right

Figure 2: The arrow shows a golf-ball sized swelling on the anterior aspect of the right fore-limb.

The left fore limb was also slightly puffy and hot but not as severe as the contralateral side. Given the above no assessment of lameness was undertaken.

Ultrasound Report

An ultrasound examination was conducted on digital flexor tendons, suspensory ligament and other surrounding soft-tissue structures on both fore limbs. The images contained within the report illustrate the extent of the injury. The full examination is contained on the enclosed CD.

Examination Date: 22nd March 2011

Right Fore Limb

The right fore superficial digital flexor tendon (SDFT) has 'blown' completely. There is a massive degree of damage to the tendon from the mid-portion downwards. The tendon's structural architecture has lost any semblance of order and the tissue matrix has collapsed. There is a significant amount of fluid within the SDFT itself and also in the surrounding area demonstrated by the multiple hypoechoogenic (black) regions on the scan image. The internal part of the tendon is of a similar consistency the blood vessel! These appearances are well demonstrated in the longitudinal and cross-sectional images in figures one and two.

The cross-sectional examination which better shows the position and extent of the injury reveals that the SDFT has a diffuse, irregular shaped border with a large section, 1cm long on the medial (inside) side absent. This is shown in figure three.

Given the extent of the soft-tissue swelling it is difficult to accurately comment upon the other structures in the area partly because they have been displaced by the fluid, blood and tissue debris that has infiltrated the area.

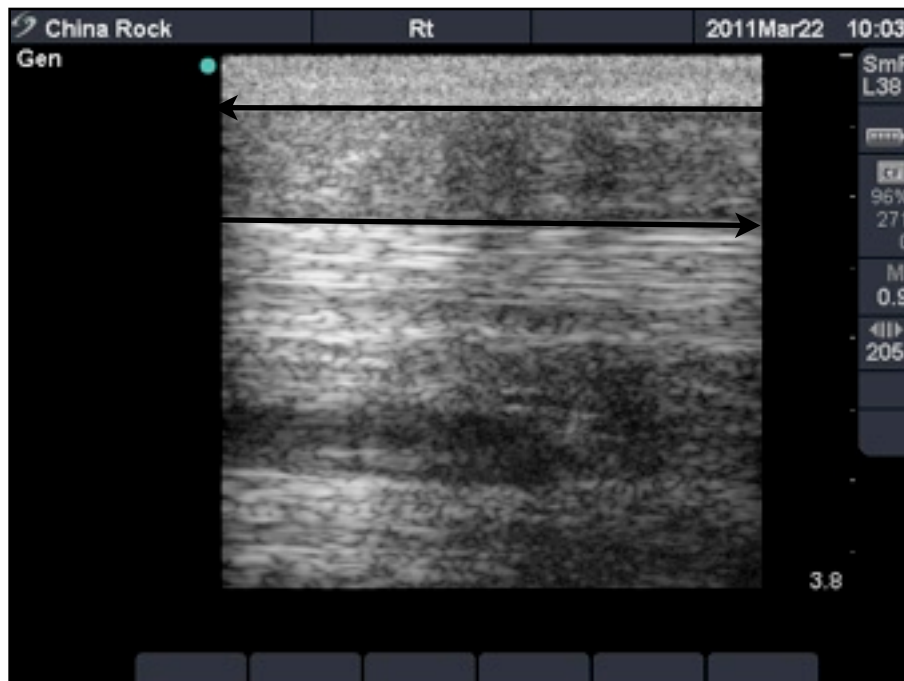


Figure 1

The right fore SDFT is highlighted between the arrows. There is no recognizable tissue matrix.



Figures 2 & 3.
Images from China Rock's ultrasound examination.

Figure 2, the cross-sectional images shows the SDFT with no discernible border and a massive degree of internal damage.



Figure 3 shows a large 'chunk' of tendon tissue absent from the SDFT. There is a large amount of fluid, probably blood in this area.

Summary

This is a catastrophic injury to the right fore SDFT. The pre-injured highly ordered structure has been destroyed. I strongly suspect that this injury has been caused by a 'tear' type mechanism rather than one of a pathological origin where the structure has failed to cope with the load bearing pressure. I draw this conclusion because of the relatively unusual presentation on the ultrasound scan where the tendon looks as though it has literally been ripped apart. The significance of this is that, if I am correct, we are not dealing with a tendon that has been slowly degenerating over time until it reached crisis point; rather an acute injury. This should improve the prognosis.

Left Fore Limb

Longitudinal Examination

The delineation of the fibrillar pattern in the left fore SDFT is slightly more defined than is commonly seen in a tendon unaffected by pathology. This appearance is present when the tendon tissue has been placed under increased strain resulting in a reaction in and a modification of the tissue type with the tendon; commonly fluid infiltrates the tendon fascicles (bundles of the smaller fibrils).

I suspect that this tendon is showing signs of increased weight bearing strain given the condition of the contra-lateral side.

Cross-Section

There are no specific areas of tissue indicating any defined lesion.

Overall Prognosis

I have requested that a veterinary surgeon assess this injury to provide an independent evaluation. The vets report is attached. Under normal circumstances, I believe, given the extent of injury, the likelihood of this horse returning to racing is remote. However, I am optimistic and given the correct management we should be able to achieve a more positive outcome. Within a month I will be able to assess how long this horse will be away from the racecourse.

Treatment Plan

When a tendon has this degree of damage there are a number of issues to consider:

1. To successfully move the injury out of the acute phase without any longterm changes to the soft-tissue structures involved
2. Whether there is sufficient new tissue (collagen) produced from the tendon cells to form a new tissue matrix
3. That the new tissue produced can configure correctly into a new extra cellular matrix, the tendon's structure, that functions with the remains of the existing one
4. Ensuring that further damage is not done to the maturing and remodeling collagen structure during the rehabilitation phase.
5. That the horse remains skeletal balanced during the rehabilitation period so secondary injuries are not acquired during the treatment process.

Update Clinical and Ultrasound Examination
28th March 2011

Five days later the right fore SDF tendon has settled down. The acute swelling is resolving. Currently, he is being walked in hand regularly and at walk is sound and surprisingly comfortable. He is bandaged on both distal fore limbs on and off throughout the day. The aim bandaging is more compression to prevent swelling as much as support.



Figure 4: Above, despite the extent of the injury China Rock's walk comfortably.



Figure 5: Right, the swelling on the anterior (front) aspect of the right fore limb has reduced significantly.

The golf-ball sized swelling shown in figure two on the anterior aspect of the right fore-limb has reduced significantly. I suspect that it was a contact injury with a fence during the race.

Farrier Report/Assessment

Initial Assessment and Shoeing Plan for China Rock

Initial Assessment:

The initial assessment of China Rock was carried out while he was stationary as he presented with an obvious and significant injury to his right fore, indicating a digital flexor tendon injury. There were also lacerations to the dorsal aspect of the third metacarpal (cannon bone).

The key points noted were as follows;

Right Fore

- The lateral aspect of the hoof wall, toe to heel quarter is high
- A broken back hoof pastern axis accentuated by the upright pastern joint
- Shoe placed too far forward resulting in a long toe
- Asymmetry to the foot. Inadequately supported by a shoe not fitted to the appropriate width to offer support upon load bearing.

Left Fore

- The medial aspect of the hoof wall, toe to heel quarter is high
- A broken back hoof pastern axis accentuated by the upright pastern joint
- Shoe placed too far forward resulting in a long toe
- The hind feet were of poor horn quality, slightly inside high, outside low and the feet were very short.

Shoeing Plan

1. Trim the feet to give a medial, lateral balance, to eradicate the imbalances as mentioned, as much as the feet will allow
2. Address the hoof pastern axis so that the shoe can be placed at the correct point to aid break over
3. Fit a graduated natural balance pad with a corresponding frog wedge, reinforced by a hoof packing material which will encourage the entire sole of the foot to bear weight more evenly, thus distributing weight and concussion

The Treatment

The latest research from The Kadler laboratory (The University of Manchester) which is undertaking a programme of specific tendon research using our unique micro-current technology, has shown that tendon is surrounded by a skin-like epithelium that protects and nourishes the tendon. The epithelium is a mixture of epithelial and stem cells. A genome-wide analysis shows that the epithelium expresses genes in common with skin epithelial cells. These genes include enzymes, keratins, chemokines, and genes of the late cornified envelope complex.

The aim of the treatment is to stimulate the epithelial cells in the skin immediately adjacent to the tendon to synthesize growth factors originating from skin epithelial cells to improve re-epithelialisation of injured tendon. The secretion of diffusible growth factors that aid tendon healing are triggered by the application of a small micro-electric current delivered to the surrounding skin via skin surface electrodes.

The treatment is painless(sub-sensory) and applied several times a day over a three to four week period. During this time regular diagnostic ultrasound assessments are conducted that monitor the progress of the tendon healing.

In addition, a programme of controlled, incremental exercise is undertaken with the aim of maintaining a balanced condition to the horse and to promote a successful remodeling phase of immature collagen tissue into the organised extra cellular matrix that forms the tendon.

Treatment Progress

Both fore feet were fitted with the graduated pads in the interest of symmetry and balance for the rest of the horse. The graduation of these pads was decreased over the treatment time as the tendon healed.

A wide web, aluminum, quarter clipped shoe was applied with a slight lateral extension to the right fore. Hind shoes of adequate width and length should also be applied in the interest of reducing uneven load bearing on both fore limbs during the recovery period.

China tolerated the treatment very well and proved to be a cooperative patient. He quickly progressed to walking comfortably in hand and being turned out in a small paddock.

Final update assessment July 2011

The right fore digital flexor tendon is unrecognizable from the one that presented in March. Clinically, it has significantly reduced in size, is firm and regular on palpation and is cool. The horse now undertakes a reasonable degree of exercise and freely canters when turned out.



Figure 6: China Rock freely cantering sixteen weeks after suffering from a catastrophic right fore-limb SDFT injury.

Figure six shows the horse cantering with a significant degree of flexion in the right fore fetlock joint that illicit no adverse affects in the right fore SDFT.

Ultrasound Examination: July 2011: Right Fore

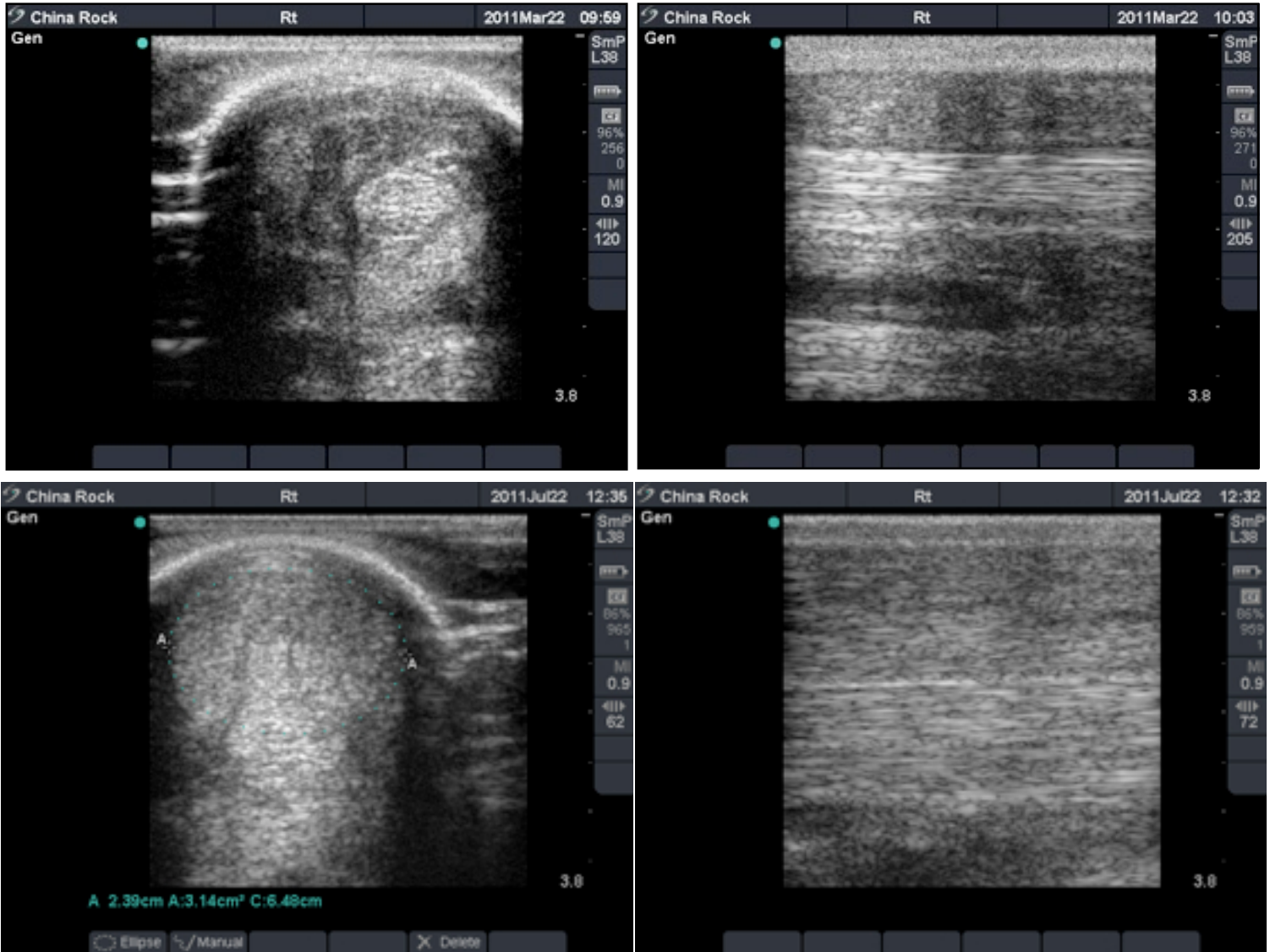


Figure 7: From top left, the original examination 22nd March 2011 to the final ultrasound examination July 22nd 2011 highlighting the improvement in the tendons structure.

The images in figure seven show the changes in the tissue architecture. The ultrasound examination indicates that the healing and tissue maturing/remodeling phase is progressing well. The longitudinal scan reveals the fibre pattern to be greatly improved although there remains small patches of less organised tissue. The cross-sectional examination shows the tendon to be an improved more regular shape with less differ edges and a significantly more homogenous appearance to the tissue texture.

Left Fore

The left fore SDFT which was reported in March to show the delineation of the fibrillar pattern to be slightly more defined than is commonly seen in a tendon unaffected by pathology. It was suggested that this appearance is present when the tendon tissue has been placed under increased strain resulting in a reaction in and a modification of the tissue type with the tendon; commonly fluid infiltrates the tendon fascicles (bundles of the smaller fibrils).

The examination in July shows the SDFT to be very much improved with no significant abnormalities to report.

Shoeing (Last shoeing, 30th July 2011)

The graduated natural balance pad with a corresponding frog wedge, reinforced by a hoof packing material shown in figure eight encourages the entire sole of the foot to bear weight more evenly, thus distributing weight and concussion. The size of the pad has been steadily reduced over the treatment period and the next shoeing should allow a normal, but wide width shoe with a good degree of heel support to be fitted.



Figure 8: shows the graduated pad with a frog wedge

Conclusion

China Rock presented with a very significant injury to the right fore SDFT. The progress of the treatment has been very satisfying and significant. Following is the suggested exercise programme for the following year which will hopefully see the horse return to racing with no recurrence of the original condition.

Suggested Exercise Regime for the following year

My suggested plan for China Rock is as follows:

1. Treatment Period, 19 weeks (March – July)

Treatment, biomechanics, low intensity exercise etc

Completed successfully

2. First Phase: Post Treatment Exercise Rehabilitation (July – September)

Initially long reined 2 times per week then after three - four weeks ridden in the school or similar for proprioceptive work and road work up to three miles by end of September. Turned out in a paddock/pen progressing to larger areas over this phase. (Note: He currently has reached the stage of a large 100m² paddock).

3. Second Phase Exercise (October - December)

Continue with school work but increase the proportion of ridden work to a variety of terrain and maintain turnout. Follow-up ultrasound examination during the second Phase.

4. Third Phase (January – April)

Increase intensity of ridden work if the ligaments have progressed sufficiently to low/medium grade 'hunt' type work. The proprioceptive work in the school will continue with a follow up biomechanics. It is important to keep a balanced musculo-skeletal condition.

5. Fourth Phase (May – July)

Semi roughed off for eight-ten weeks and then ridden from the field 1/2 week

6. Pre-training (August/early September)

The following principles should apply to the above:

- Consistency & repetition: Exercise little and often
- Treating the body as a whole: trying to maintain musculo-skeletal balance
- Ensuring that any increase in the level of exercise in terms of frequency, intensity or duration, is taken in small step-wise incremental manner
- Good shoeing, keep the toe short and use a shoe with plenty of lateral and heel support
- Avoid aggravating external factors such as uneven surfaces for example deep sand-based surfaces, NO automatic horse-walkers!

David Chapman-Jones. 3rd August 2011