

Overview of Procedures Used by Practicing Veterinarians for Percutaneous Injection of the ACell Vet™ Powder for Treatment of Equine Tendon and Ligament Injuries

Note: INSTRUCTIONS FOR USE OF ACELL VET POWDER ARE FOUND IN THE PRODUCT INSERT. THIS IS NOT THE PRODUCT INSERT. This document is offered as a courtesy, and provides an overview of the general protocol utilized by various experienced investigators who have found ACell Vet Powder to be safe and effective for the treatment of equine tendon and ligament injuries. The actual treatment protocol utilized should be based on the assessment of each individual case by the attending veterinarian. Consequently, this document is provided for background and informational purposes only. If you have any questions about ACell Vet Powder or the information contained in this document please contact the **ACell customer and technical support line: 1-800-826-2926.**

1. Recommended Syringe

It is recommended to pre-load multiple syringes with 1.5ml of ACell Vet Powder suspension in preparation for injections. For example if a horse is to be injected in three separate locations, then three separate syringes would be needed. The syringe preferred by many experienced investigators is a 6cc luer lock syringe.

2. Recommended Needle

As a general matter the 23 gauge x 3/4" needle is recommended as it prevents re-flow of ACell Vet Powder suspension through the injection site. For example, a 23 gauge x 3/4" needle generally should work well superficial digital flexor tendon including branches in pastern and part behind carpus (see below 2A). However, for a deep tendon or ligament such as the gastrocnemius tendon (see below 2B) or a suspensory ligament and deep digital flexor tendon (see below 2C) a larger needle is recommended.

- A. 23 gauge x 3/4" needle
 1. Superficial digital flexor tendon including branches in pastern and part behind carpus.
- B. 20 gauge x 1 1/2" needle
 1. Gastrocnemius Tendon
- C. 21 gauge x 3/4" needle and 21 gauge x 1 1/2" needle (see suggestions below regarding needle length)
 1. Deep digital flexor tendon behind fetlock and in pastern area: Injection approach is the lateral position.
 2. Suspensory ligament: insertion, body and branches. After careful lameness examination including analgesia and ultrasonography, inject as follows:
 - a. 21 gauge x 3/4" needle deep into insertion area in cases of high suspensory damage.
 - b. 23 gauge x 3/4" needle into body and branch.
 - c. 20 gauge x 1 1/2" needle in proximal suspensory ligament
 - d. In hind legs with insertion desmopathy, a proximal metatarsal fasciotomy should be considered in connection with ACell Vet Powder suspension if the first injection has not achieved complete healing. In severe cases it is recommended that, as the initial treatment, both procedures be performed concurrently.

3. Preparation

- A. Perform ultrasound examination to determine location of injured tissue.
- B. The acute lesion should be treated conventionally with ice and NSAIDs until the intra-tendinous bleeding is stable. After this initial inflammatory phase the ACell Vet Powder treatment can proceed.
- C. Combine ACell Vet Powder with sterile saline and agitate to ensure complete suspension of powder.
 1. 0.2 g of ACell Vet Powder with 6 ml of sterile saline
 2. 0.1 g of ACell Vet Powder with 3 ml of sterile saline
- D. Administer medication so that the injection procedure can be performed under standing sedation (suggested agents: detomidine, butorphanol). If still sensitive, regional anesthesia should be considered.
- E. The injection should always be performed under ultrasound guidance to insure that the ACell Vet Powder is injected directly into the lesion.

4. Injection Guidelines

- A. Clip and aseptically prep site of injury using a surgical scrub and rinse thoroughly with sterile saline.
- B. Use a linear ultrasound probe 7.5MHz with stand off – check focus.
- C. Make a transverse ultrasound image of the proximal part of the lesion.
- D. Utilizing a single percutaneous injection location, use the ultrasound imaging to guide your needle into the lesion.
- E. Perform an ultrasound guided injection directly into the lesion as follows:

When you see the point of the needle in the central part of the lesion inject the ACell Vet Powder suspension **directly into the lesion** in a “fanning mode” in each of three locations: one injection proximal in the borderline to the non-traumatic tissue, one in the central area of the lesion, and one in the distal borderline of the lesion. As recommended in 1 above, a separate syringe should be used in each of the three locations.

In large lesions the central region is given 2-3 injections in a fanning manner. Inject approximately 1-1 1/2ml of the suspension in each of the fanning sites. The injection should be done with full weight on the leg except for the proximal part of the suspensory which can be done with the leg flexed. If there is strong injection resistance check for correct needle position on your ultrasound screen. **Inject only the amount of suspension needed to fill the lesion. Do not force or overfill.**

- F. Make a transverse ultrasound image of the middle and distal areas of the lesion and repeat step E if there is a location in the lesion that has not been filled.

5. Post Injection Guidelines: Inflammation

Some patients react locally with swelling, heat, and moderate pain (lameness) for 2-5 days. The reaction has no influence on the ACell Vet Powder function. The following is recommended for minimizing and/or treating these reactions as well as optimizing overall treatment results:

- A. Administer 1mg/kg flunixin meglumine intravenously at the time of treatment, continuing with 250 mg flunixin meglumine, BID, orally for a total of five (5) days.
- B. Apply a sterile bandage to the treated leg for 2-4 hours.
- C. After 2-4 hours, remove bandage and ice the limb for 30 minutes at the affected area BID (3 times daily) for three days. **The importance of icing and its inhibition of tissue degenerative enzyme activity and development of edema cannot be stressed enough.**
- D. Administer Sulfadiazine/TMP orally SID (once a day) for 5 days if a surgical procedure (fasciotomy) has been performed with the injection.
- E. Do not apply any products or sweat therapies to the affected tendon or ligament site that will generate additional heat to the area.

6. Post Injection Guidelines: Rehabilitation Protocol

Exercise is a very important part of the rehabilitation and wound healing process as the ACell Vet Powder requires a physiological load/stress on the tissue. Controlled physical activity is highly recommended. It should also be noted that the rate at which a patient recovers from an injury is dependant upon many variables (Size, location, and the age of the lesion). It is recommended that each patient be evaluated weekly and the progress noted before continuing to increase activity at any stage.

- A. Acute Lesions
 1. First 24 hours post treatment: Stall rest
 2. Days 1 – 13 post treatment: Begin hand walking 10-15 minutes, twice daily, once in severe cases. Even if the horse is uncomfortable, some activity is encouraged.
 3. Day 5 post treatment: Optional ultrasound evaluation five (5) days post injection to assess healing response.
 4. Days 14 – 21 post treatment: Hand walking 15-20 minutes twice daily, once in severe cases.
 5. Days 22 – 60 post treatment: Continue hand walking, increasing the duration, for the first thirty (30) days after the injection. Then light trotting in a straight line and walking under tack 20 –35 minutes once or twice a day. **Light trotting only in cases with no lameness!**
 6. Day 30 post treatment: Ultrasound evaluation at thirty (30) days is recommended to assess healing response.
 7. Days 30 – 60 post treatment: If the animal shows no signs of lameness continue to increase the activity by 5-10 minutes each week for up to sixty (60) days post injection.
 8. Day 60: Ultrasound re-examination should be compared to the initial scans. If the horse is ultrasonographically and clinically sound, continuous physical rehabilitation should continue.
 9. Day 60 and after: If the animal continues to show no signs of lameness, increase the activity at sixty (60) days to light trotting and walking under tack 20-35 minutes daily.
 10. Day 120 and after: All surgical cases should be hand walking by 120 days.
- B. Chronic lesions of the suspensory origin and body –
 1. Begin hand walking for 10 minutes twice a day for 30 days.
 2. Walk/trot after thirty (30) days if there is no lameness.
 3. Newer injuries – continue walking an additional thirty (30) days, however, may often be done under saddle.