K-9 case summary: Trooper Porter

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For The Education Center

Trooper Porter, a law enforcement K-9, is a 5-year-old male neutered German shepherd that was injured during a search and rescue mission, where he fell 25 feet from a cliff and injured his right forelimb. After being rushed to a local emergency clinic, radiographs ruled out the possibility of a fracture.

Six weeks later, an MRI revealed no fractures or ligamentous tears but apparent bone bruises to the radial carpal, the second carpal, and the head of the second metacarpal bones. The surgeon overseeing Porter's case recommended an arthrodesis to fuse the carpus, but this treatment would have effectively ended Porter's career. Unfortunately, there was not enough funding available for this procedure, so Porter's forelimb was placed in a splint to await further evaluation, which ultimately caused further dysfunction.

During this time, Porter was undergoing therapy at a local rehabilitation facility. Little improvement resulted from the rehabilitation treatments, so his therapist reached out to me at Veterinary Orthopedic & Sports Medicine Group (VOSM), as she knew that I was a conservative surgeon who thinks outside the box. Due to limited financial resources, Porter's handler immediately contacted Project GO (Global Orthopedics for Animals), a nonprofit organization committed to providing funding for cutting-edge clinical care to injured animals worldwide via orthopedic and neurologic services, for approval to evaluate and potentially treat Porter. Project GO agreed to fully fund all of Porter's orthopedic needs to ensure his complete recovery and return to the police force. Project GO arranged Porter's visit to VOSM for further evaluation and treatment.

Examination at VOSM

Porter exhibited nonweight bearing to toe-touching lame in the right forelimb, marked muscle atrophy of the right antebrachium, moderate carpal hyperextension was noted in the right carpus, discomfort upon palpation of the right antebrachial carpal joint, mild medial collateral laxity, and discomfort upon palpation of the flexor carpi ulnaris tendon. The remainder of the orthopedic evaluation was within normal limits.

Findings from a musculoskeletal diagnostic ultrasound were consistent with right grade 1-2 flexor carpi ulnaris humeral component strain, grade 1 flexor carpi ulnaris ulnar component strain, and a moderate (grade 2) medial collateral ligament sprain.

An additional MRI revealed bone bruising or microfractures of the right intermedioradial carpal bone consistent with the prior history of trauma but without evidence of ligamentous or tendon damage.

One year to the day of Trooper Porter's initial injury, he returned to duty with his handler.

I recommended a conservative approach: Stem cell and platelet-rich plasma (PRP) injections into the site of the lesions under ultrasound guidance in addition to a carpal brace and postoperative rehabilitation program. The hopes were that as tendon and ligament fibers still were intact, the injured tissues would further heal or "regenerate." The carpus could be fused if this treatment did not work; however, the primary objective was to get Porter back to work.

Trooper treatment

A sample of Porter's bone marrow was collected from his femur along with a blood sample; both were processed into bone marrow-derived stem cells and PRP, which were combined and injected with ultrasound guidance into the right flexor carpi ulnaris, the ulnaris lateralis tendon, and the medial collateral ligament.

Measurements were taken for a custom carpal support wrap as well as a cast molding for a custom carpal orthotic. In the meantime, Porter was placed in a fiberglass splint and returned home with instructions to continue rehabilitation therapy until his four-week recheck at VOSM. Activity restriction instructions were provided that would continue throughout Porter's postoperative recovery. Once the custom carpal orthotic was completed, his rehabilitation therapist was instructed how to fit it locked in full extension.

Porter's progress

Four weeks post-treatment, on physical examination at VOSM, Porter was using the right forelimb 50 percent of the time in the carpal orthotic. During the stance phase, he still showed signs of carpal hyperextension in the orthotic due to too much extension to the hinge. Swelling in the carpus was improved. Mild skin irritation was noted under the orthotic straps. Moderate atrophy was noted to the region of the carpus and forelimb. The right carpus was restricted in flexion.

The four-week musculoskeletal diagnostic ultrasound recheck revealed that the right grade 1-2 flexor carpi ulnaris humeral component strain, the grade 1 flexor carpi ulnaris ulnar component strain, and the moderate (grade 2) medial collateral ligament sprain all showed decreased inflammation and slight improvement in fiber pattern. It was recommended that Porter be kept in the custom orthotic at all times and continue with activity restrictions and rehabilitation therapy. The custom orthotic was adjusted to limit extension during use.

Eight weeks post-treatment

At his eight-week recheck, Porter was using the right forelimb very well and appeared to be much more comfortable and functional in the orthotic. During the stance phase, he no longer showed signs of carpal hyperextension in the orthotic. Swelling in the carpus was improved. No skin irritation was noted under the orthotic straps. Moderate atrophy was still noted to the region of the right carpus and forelimb (but further improved from the four-week recheck). The carpus was restricted in flexion.

The eight-week musculoskeletal diagnostic ultrasound recheck revealed that the right grade 1-2 flexor carpi ulnaris humeral component strain showed decreased inflammation and slight improvement in fiber pattern. The grade 1 flexor carpi ulnaris ulnar component strain and the moderate (grade 2) medial collateral ligament sprain both showed decreased inflammation and significant improvement in fiber pattern. The orthotic was dynamized one notch in extension, and the block was removed for flexion, which allowed Porter half range of full flexion. Recommendations were to continue dynamizing one notch every one to two weeks as long as Porter continued to improve in lameness and didn't show any hyperextension in his right carpus. Porter was to remain in the custom orthotic at all times and to continue with activity restrictions and rehabilitation therapy.

Thirteen weeks post-treatment

Porter was using the right forelimb very well and appeared to be much more comfortable and functional in the orthotic. During the stance phase, Porter no longer showed signs of carpal hyperextension in the orthotic. Swelling in the carpus was improved. Mild skin irritation was noted under the orthotic straps. Moderate atrophy was still noted at the right carpus and forelimb (but further improved from the eight-week recheck). The carpus was less restricted in flexion and less carpal effusion was noted. Improved collateral stability was noted.

The thirteen-week musculoskeletal diagnostic ultrasound recheck revealed that the right grade 1-2 flexor carpi ulnaris humeral component strain showed improved fiber pattern, but more healing needed to occur. The grade 1 flexor carpi ulnaris ulnar component strain and the moderate (grade 2) medial collateral ligament sprain both appeared resolved. The orthotic was dynamized one additional notch in extension, which allowed Porter increased extension without hyperextension. Recommendations were to continue dynamizing one notch every one to two weeks as long as Porter continued to improve in lameness and didn't show any hyperextension in his right carpus. Porter was to remain in the custom orthotic at all times and to continue with activity restrictions and rehabilitation therapy, which now could include hydrotherapy. Once he became fully dynamized in his orthotic, a neoprene support wrap was used for his continued therapy.

Porter continued his dedicated rehabilitation program with his local therapist in the following months, and slowly his activity restrictions lessened as he gradually returned to training for recertification into the police force. One year to the day of Porter's initial injury, Project GO received word that Porter completed and passed all of his recertification requirements, and he returned to work with his handler. ●

Dr. Canapp is the chief of staff of Veterinary Orthopedic and Sports Medicine Group in Annapolis Junction, Md., and serves as the president and CEO of Orthobiologic Innovations LLC. His areas of interest include regenerative medicine, sports medicine, and minimally invasive surgery.

This Education Center article was underwritten by Companion Animal Health of Newark, Del.