

## Kush™ Canine Case Study Report

Michael J. Sterns, DVM

The Kush Canine particles for intra-articular injection is a medical device designed to prevent the occurrence and reoccurrence of joint pain from loss of cartilage or tissue-bone mechanical malfunction caused by joint dysfunction not associated with infection (e.g., lameness, osteoarthritis). The injected Kush particles are micro-sized lubricious cushions that provide an artificial cartilage effect to protect the joint's natural tissue during joint articulation.

There is an unmet need to treat canine osteoarthritis (OA) that is safe, affordable, easily administered, efficacious, and without adverse side effects. At Alta View Animal Hospital we see arthritic dogs daily. The canine patient population represents 65 percent of our revenues. Our current treatment for canine OA relies on NSAID's, including Cox-2 inhibitors, plus or minus tramadol or gabapentin to reduce pain and inflammation. These pharmacological treatments have several problems, including limited effectiveness and difficulty with owner/patient compliance. There may also be a large unmet need for injection of particles at the time of TPLO surgery, including their use in the contralateral stifle joint to delay or prevent further degenerative changes.



Dr. Sterns & Bruce the English mastiff

**Breed:** English mastiff  
**Sex:** Male, Neutered  
**Age:** 3 years  
**Weight:** 220 lbs.  
**Condition:** Ununited Anconeal Process, Degenerative Joint Disease Left Elbow, Inoperable. (See Radiology Report attached)

**Admitted to clinic:** 12/2015 for swelling, joint effusion and radiographic evaluation, (5/5 lame)

**Treatment:** *Kush Canine intrarticular injection, one syringe plus 4mg triamcinolone*

### **5 Day & 2 Week Follow Up:**

Bruce is running around yard, estimated by owner to be 2/5 lame after exercise. His enthusiasm continues, and he has stayed at the same level of mobility for the last fourteen days post injection. *The owners consider this incremental improvement a great success.*

Overview of initial results and observations:

The Kush canine treatment device is delivered via intra-articular injection with a local anesthetic block. The particles inject easily and smoothly into the synovial space using a 22 gauge, 1.5” needle. This is a straightforward procedure to perform. The proposed pricing structure for the product makes it economical to use, and no special equipment or instruments are required. If consistent long-term efficacy is seen after treatment, then drug therapy can be reduced or potentially eliminated in some cases.

**Michael J. Sterns, DVM**

After graduating from the UC Davis School of Veterinary Medicine in 1984, Dr. Sterns began his career as an Equine Veterinarian. He earned his MBA from the Haas School of Business at UC Berkeley in 1990, and spent the next twenty-three years building small companies in human therapeutics, medical devices and research tools. Dr. Sterns returned to clinical practice in 2012, and now practices general small animal medicine and surgery at Alta View Animal Hospital in Mountain View, California. He is now accompanied on calls by his sidekick, Casey, a six-month old Brittany Spaniel.

**Radiology Report (2342654-15/Radiographs Only)****Patient Name:** BRUCE KRUCKENBERG (29479)**Requesting Doctor:** Paul Ghumman, DVM**Species:** Dog**Age:** 3Yr 1Mo**Gender:** Male, Neutered**Breed:** English mastiff**Weight:** 220.00 Lb

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**HISTORY:** left elbow swollen, NWBL, wbc 32 k, CYTOLOGY- SEPTIC, NEUTROPHILS WITH COCCI ENGULFED, MACROPHAGES, NO CANCER CELLS

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**THORAX** November 24, 2015: A lateral view is provided.**FINDINGS:** There is a small amount of gas in the esophagus. The cardiovascular structures are normal. There is a caudodorsal bronchial pattern that is likely exaggerated by or entirely created by the radiographic technique. No pleural effusion is seen. No other significant abnormalities are seen.**LEFT ELBOW** November 24, 2015: Two lateral views and 2 craniocaudal views are provided. They appear to be the same orthogonal study submitted twice.**FINDINGS:** The peri-articular soft tissues are very swollen. There is severe elbow osteoarthritis. The anconeal process is ununited. No bone lysis is seen. The right elbow is partially included and mild osteoarthritis is noted on that side. No other significant abnormalities are seen.

Incidental findings include mid-thoracic spondylosis and mild shoulder osteoarthritis.

**CONCLUSIONS:** Unremarkable thorax. Left elbow osteoarthritis secondary to ununited anconeal process. Secondary septic arthritis is presumably present if the cytology above refers to joint fluid analysis. Septic cellulitis would be present if the soft tissues were sampled.**RECOMMENDATIONS:** Antibiotic therapy is recommended. Given the degree of degenerative joint disease, arthroscopic or surgical intervention in the joint may be of limited usefulness but consultation with an orthopedist could be considered. CT of the elbow(s) might be helpful.If you have questions, please contact me directly at [jennifer-hanson@idexx.com](mailto:jennifer-hanson@idexx.com). For URGENT questions, call 1-888-RADVETS and speak to the radiologist on duty if I am not immediately available. This contact information is for veterinary staff only. Thank you.**Requested By:**Paul Ghumman, DVM  
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690 Showers Drive  
Mountain View, CA 94040  
P: 650-948-1021  
F: 650-948-8860

re: BRUCE KRUCKENBERG (29479)

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(Continued)



Jennifer Hanson, DVM, Dip. ACVR

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