Center for Companion Animal Health, UC Davis School of Veterinary Medicine

CCAH update

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School of Veterinary Medicine

## Also in this issue:



*The Center for Companion Animal Health (CCAH) is dedicated to advancing studies in veterinary medicine—including new ways to prevent, diagnose and treat diseases such as cancers, genetic and immune disorders, infectious diseases, kidney and heart diseases, and nutritional disorders in companion animals.*

*By Dr. Niels Pedersen*

# Degenerative Joint Disease (Osteoarthritis) in Dogs and Cats

Joints—such as hips, knees, shoulders and elbows—are made up of bone ends capped by cartilage and encircled by a fluid-filled fibrous sack. Cartilage cushions each bone and provides a smooth gliding surface for articulation of the joint.

Cartilage, like nervous tissue, has a limited ability to regenerate—each person's or pet's cartilage is expected to last a lifetime. Because cartilage wear is inevitable, every animal, including humans, will suffer some degree of cartilage loss if they live long enough.

Once cartilage loss exceeds a critical level and bone damage begins to occur, clinical signs or symptoms progress in an orderly fashion termed "degenerative joint disease" or "arthritis."

The word arthritis means "joint inflammation," which is a misnomer, because inflammatory changes are minimal in degenerative joints, and because "arthritis" connotes only one type of joint disease, when there

*Continued on page 2*

## National Pet Week: May 7–13, 2006

## "Fitness Unleashed"

Physical fitness is a health target the Auxiliary to the AVMA would like to see all members of the family attain—including pets. With this year's theme, National Pet Week celebrates the human-animal bond by promoting overall health, responsible pet ownership, and awareness of veterinary medicine.

**Simon (with Matt Tenwolde) leaps through a hoop jump, and Woody negotiates the teeter-totter on the new agility course in Edna's Park at the CCAH. Bailey shoots through the tunnel and (with Heather Zander) takes a hurdle. Bailey (the golden retriever with Mario Dinucci) winds through the weave poles. The human friends are members of the School of Veterinary Medicine class of 2007.**

# Director's Message

Dear Friends:

The *CCAH update* has a new format. We have kept sections that we feel are important, such as "Our Friends and Companions," and "In the Spotlight." These two features honor our two greatest contributors—pet lovers and the dedicated veterinary practices that choose to honor their clients' pets through our companion animal memorial program. We have also kept the "Behavior Tip," and added a topical section written each time by one of our noted faculty members.

To be fair, I have gone first with a discussion on the common type of arthritis (osteoarthritis or degenerative joint disease) that plagues most of us as we age, including our pets. My clinical specialty, in addition to feline medicine and immune diseases, was rheumatology.

I hope that you enjoy our new format and please feel free to suggest future topics.

Please remember National Pet Week and enjoy the pictures of our new memorial brick and agility park, named after a very special little dog named Edna. The gardens around the CCAH building are finished and receive many favorable comments.

I can now honestly say that the building is finally complete. It is a joy to see and one of the most functional buildings on campus. Come visit us anytime.

Yours sincerely,

Niels C. Pedersen, DVM, PhD
Director, CCAH

## Degenerative Joint Disease

*Continued from page 1*

are actually many—including gout, rheumatoid arthritis, and a number of genetic and immune-mediated diseases. "Osteoarthritis," an alternative and commonly used name for degenerative joint disease, is preferable to "arthritis," because it indicates the importance of both bone and joint.

The signs of degenerative joint disease (DJD) in dogs and cats are similar. Cats are like little dogs—their clinical signs of DJD are milder or of later onset because they are small and light weight.

The severity and progress of DJD depend on genetic predisposition and environmental or traumatic factors.

### *Signs of degenerative joint disease in dogs and cats are similar.*

Genetic predisposition may involve a number of yet-to-be-discovered factors that accelerate cartilage wear. Primary DJD can develop at any time and can involve more than one factor.

Secondary degenerative joint disease is associated with underlying disorders that increase or accelerate the normal rate of cartilage loss. Many of the underlying disorders are concentrated in purebreds. They can be classified into two major categories: 1) disorders leading to an abnormal concentration or direction of force on a normal joint and, 2) those associated with a normal concentration of force on an abnormal joint.

Conditions associated with abnormal forces on normal joints include trauma to the cartilage (e.g., repeatedly jumping down from high places or excessive exercise), hip dysplasia, elbow dysplasia, ruptured anterior cruciate ligament, congenital varus or valgus deformities (such as pigeon toed, knock-kneed or bow-legged animals), malalignments caused by improperly healed fractures, and achondroplasia (short, stout limb structure seen in many dog breeds such as Bassett hounds, Dachshunds, Bull dogs, and Beagles).

Being overweight may be one of the more important causes of increased force on otherwise normal joints.

### *Radiographic signs do not always parallel clinical signs.*

Research shows that if an animal is overweight, not even to the point of obesity, the chances of developing DJD are much higher than for animals of normal weight.

Disorders associated with normal forces on abnormal joints include osteochondrosis (a focal degeneration of cartilage and underlying bone seen in several breeds of dogs), dissolution of the femoral head (a disorder in some toy breeds), patellar luxation (also a common disease of toy breeds), immune joint disease (rheumatoid arthritis or lupus-like joint disease), and certain congenital diseases affecting bone strength.

*Continued on page 3*

# Degenerative Joint Disease

*Continued from page 2*

## Recognizing DJD

The earliest sign of degenerative joint disease is a reluctance of the dog or cat to perform certain tasks or maneuvers.

In the next stage, lameness and stiffness occur following periods of sustained activity or brief overexertion. After several days of rest, the clinical signs often disappear.

As the degeneration becomes more severe, stiffness may be most pronounced following periods of rest, but with movement the animals appear to "warm out" of their lameness or stiffness. Cold and damp weather often increases the severity of clinical signs.

In the final stages of the disease, stiffness, lameness and loss of mobility are fairly constant, although the severity of signs may still be influenced by environmental factors. Dogs may show signs of increased irritability and reclusiveness, and will snap or bite when approached or touched. Unfortunately, this type of behavior is often directed against children. The owners may not appreciate that chronic underlying pain is responsible for the dog's irritability.

There are usually no systemic signs of illness on blood tests, redness and heat are not observed, and appetite is unaffected. Joints may be enlarged because of the buildup of bone at the margins and/or a buildup of joint fluid.

Restrictions in the range of motion of the joint may be noted, and "grating" (crepitus) may be elicited in severe cases.

Radiographs, the classic method for evaluating degenerative joint disease, reveal the collapse of the joint due to the disappearance of cartilage, thickening of the underlying bone, lipping of the bone along the joint margins, formation of bone spurs, and in severe cases, evidence of joint instability.

Radiographic signs do not always parallel clinical signs. Animals with severe radiographic signs may still be surprisingly functional, while others with minimal signs may be severely affected. The use of MRI and CAT scans and arthroscopy to evaluate joint disease is becoming more common.

Jonty, who tends to "go easy" on his hindquarters when running, is able to do moderate exercise despite being an older dog.

## Management Strategies

Degeneration of the cartilage is a normal aging event that cannot be prevented, but it can be minimized. Retarding the growth of large breed dogs, by feeding specifically created diets, and keeping animals from becoming overweight will help their joints to function longer.

High impact activities, especially of a repetitive nature, should be avoided by dogs with known problems. Work or performance level activities should only be undertaken

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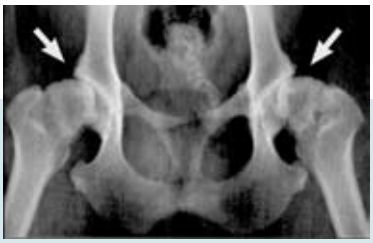

Top left: Severe elbow dysplasia from improper fusion of part of the ulna (foreleg bone), and degenerative joint disease (DJD).

Bottom left: Dog knee with DJD and inflammation (cloudy areas). Changes around the bone include a bone spur below the patella (knee cap).

Center: Radiograph of normal canine hip joints and knees. The even, dark space between the femur and tibia on each side indicates the position of normal cartilage.

Right: Hip dysplasia—on each side, the femoral head (ball) is misshapen and the acetabulum (socket) is shallow.

*Photos courtesy of Dr. Amy Kapatkin, associate professor of companion animal orthopedic surgery at UC Davis. Dr. Kapatkin studies kinetics (the force of motion) and kinematics (the motion of joints), which give an objective measure of how a patient is progressing after treatment or surgery. She and her faculty colleagues are working to develop a permanent gait analysis laboratory.*

# *Our Friends and Companions*

**Socks**
(2005–2005)
North Hollywood, CA

*Dr. Pedersen:*
*I am so glad I was able to talk to you about the passing of my kitty "Socks" and the questions and concerns I had about her condition, "mega-colon." I know I must move on, but it is very hard. I don't know why I feel so sad about her leaving us. I know that people who love their animals feel the same way I do. I have owned many pets—all have passed much older and I loved all of them the same—but with "Socks" it is different, perhaps because she was just a baby, and I will not accept her leaving so young. She was only four months." —Elizabeth Palacios*

*Dr. Heers,*
*Your sensitivity to my loss of Nickie and your contribution in her memory, together with my new awareness of the Companion Animal Memorial Fund and the objective of the fund, is certainly more than a "dual contribution," but rather an extremely generous and sensitive gesture for the benefit of all companion animals. 'Thank you' is a heartfelt understatement of my appreciation for your gesture.*
*—Terry Langiano*

**Nickie**
(1993–2005)
Tulare, CA

**Buddy**
Tahoe City, CA

**Page** and **Aggie**
Fairfield, CA

**Sturgis**
(2003–2004)
San Jose, CA

**Michelle**
(1994–2005)
San Francisco, CA

**Waffles**
San Francisco, CA

**Tottsie**
(1991–2005)
Modesto, CA

**Hank**
(1993–2004)
Sanger, CA

**Karma**
(1993–2005)
Walnut Creek, CA

**Luciano**
Parke, CO

*"Thanks to Alameda East Veterinary Hospital and Dr. Jeffrey Steen for their compassionate care."*
*—Helen Robinson*

**Pierre** (1989–2003)
**Nicole** (1990–2001)
Merced, CA

**Lucy Ann**
Parke, CO

## Degenerative Joint Disease

*Continued from page 3*

by dogs who are conditioned and not predisposed to DJD.

The most important preventive is to select puppies that are not predisposed to DJD potentiators such as hip or elbow dysplasia.

The treatment of degenerative joint disease involves the following steps: 1) adequate daily periods of rest, 2) avoidance of overexerting affected joints, 3) reduction of body weight if the animal is overweight, 4) properly administered exercise, 5) relief of pain by anti-inflammatory and analgesic drugs, and 6) orthopedic operative procedures to relieve pain, regain lost motion, or correct deformities or instabilities.

*Most over-the-counter and prescription non-steroidal anti-inflammatory drugs (NSAIDs) are toxic to dogs and cats.*

Animals with degenerative joint disease, regardless of severity, should not exercise beyond the point where signs are made worse. If the dog loves to jog with his owner, he should not be allowed to exercise to the point of lameness in the hours or days afterward. He should jog for a short time, then be allowed to rest.

Working dogs or field dogs may not be able to work as hard or as long, and should not be pushed beyond the point where disease signs become acute. This is always difficult with dogs, because they will push through great pain to please their owners and engage in favorite activities. Swimming can be a preferable exercise over jogging, walking or running.

Clinical signs eventually progress until simple changes in weight and activity will not suffice. At this point analgesic and anti-inflammatory drugs prescribed by your veterinarian are often necessary.

### Treatment Options

Because many of the drugs used to combat the pain of DJD have both beneficial and deleterious effects, including toxicity, proper veterinary supervision is mandatory.

Most over-the-counter and prescription non-steroidal anti-inflammatory drugs (NSAIDs) are toxic to dogs and cats. The drug carprofen (Rimadyl) is frequently prescribed by veterinarians. However, dogs on this drug should be periodically monitored for toxic side effects. Prednisolone has also been used, but also has several undesirable side effects and may actually worsen DJD over the long term.

Nutriceuticals containing glucosamine and chondroitin sulphate are popular for both humans and pets, although double-blind tests in both animals and humans have not always shown them to live up to their claims.

Surgery can sometimes be helpful but should be used very selectively and at end-stage disease.

Some types of joint instability resulting from ligament damage or joint malformation may benefit from surgery. Examples are ruptured anterior cruciate ligaments, patellar luxation, and hip dysplasia. Fusion of joints such as the elbow, carpus or hock is occasionally warranted to help relieve pain and restore some function. Femoral head removal or the insertion of a prosthetic joint often gives significant relief. Yet prosthetic joints such as the hip or elbow do not seem to last as long in dogs as they do in humans.

*Degenerative joint disease in animals parallels the disease in humans.*

It is not always easy to determine whether it is better to do surgery or to take a more conservative approach.

Many older pet owners, who suffer from the very same disease and have long given up hope of having normal joint function, come in to the clinic with their aged dog or cat wanting their veterinarian to treat the "arthritis" and return the animal to normal activity.

It is helpful to understand that degenerative joint disease in animals parallels the human disease in how it occurs, progresses, and is treated. Even though we cannot cure DJD, environmental changes coupled with medical or surgical treatment can help us enhance the quality of our pets' lives.

### Degenerative Joint Disease in Cats

**Radiographs of cats older than 10 years often show changes indicating degenerative joint disease, especially in shoulders and elbows, and sometimes in hips and knees.**

**The front limbs are more frequently involved, because a greater proportion of the feline body mass is distributed over the forelegs. Cats jump from amazingly high places, and most of this force is on the forelegs. If the cat is overweight, it puts even more stress on her joints.**

**Classical DJD in cats is symmetrical. If a single joint is affected rather than paired joints, it is more likely due to some earlier trauma that went unappreciated. Severe disease in the hips, out of proportion to disease in the forelimbs, may suggest hip dysplasia.**

## Inscribe a Lasting Tribute to a Special Friend or Companion

Honor or memorialize a special companion, friend or family member with a unique inscription in Edna's Park at the east entrance to the CCAH.

The park was created in memory of Edna, the beloved dog of Ms. Charlotte Goland of Sacramento, California.

Ms. Goland and her family were so pleased with the treatment Edna received while in the care of the Veterinary Medical Teaching Hospital, they decided to create something to help all the pets that come to UC Davis.

Together, the Golands and the CCAH created Edna's Park, which features an agility course (see "Fitness Unleashed" on page 1) and a tranquil memorial brick courtyard.

With a contribution of $100 or more, you can inscribe your lasting tribute in Edna's Park.

Your gift will help the CCAH devise new and innovative strategies to diagnose, treat and prevent health problems of small companion animals.

For more information about how you can inscribe your brick in Edna's Park, please contact the Development Office, (530) 752-7024, or Celeste Borelli (clborelli@ucdavis.edu).

# Thank you for your generosity!

In 2005, more than 1,300 thoughtful donors helped the Center for Companion Animal Health continue its mission to improve animal health and well-being. Every gift makes a difference and is appreciated—thank you to each and every benefactor.

## Friends of Companion Animals Honor Roll

For gifts of $1,000 or more received between July 2004 and June 2005

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## *In the Spotlight*

***Recognizing Our Many Companion Animal Memorial Fund Sponsors***

# Cross Street Veterinary Clinic, Tulare, California

Richard Heers and Ralph Walton, partners in a mixed veterinary practice in Tulare, are both graduates of the UC Davis School of Veterinary Medicine class of 1976.

Dr. Walton, who bought the clinic in 1978, practices food animal medicine on Tulare area dairy farms. Dr. Heers, who joined the practice in partnership with his friend and colleague in 1979, practices small animal medicine at the clinic.

Dr. Heers' veterinary medical education at UC Davis was focused on a "mixed" track—food animals, horses and small animals—and his first job was balanced between the three. He has treated a variety of animals over the years, but his practice is now focused on cats and dogs. The two veterinarians share the office, yet have essentially two independent practices. Dr. Heers says they get along very well, so the arrangement works perfectly.

Dr. Heers and Dr. Walton have stepped forward to "Take a Seat" in the campaign to raise funding for the new veterinary medicine instructional facility that is nearing completion—it will be dedicated June 15 as Gladys Valley Hall.

"The University of California has been very good to us, and we're donating a bit back," says Dr. Heers. "The university is a great institution that offers a tremendous, wonderful education." His wife, Lee Ann is a 1979 graduate, and two of his three daughters are currently undergraduates at UC Davis. Dr. Walton's daughter, Becca, who plans to focus on dairy animals, has just been admitted to the School of Veterinary Medicine.

Dr. Heers enjoys taking care of animals in a general practice, better described as veterinary family practice. He usually refers patients with difficult problems to specialists in the region, or often to the Veterinary Medical Teaching Hospital and CCAH.

"We have wonderful clients—most have been with us for many years. Not only are the animal patients multi-generational, but some of the kids who used to come to the clinic with their parents years ago are now married and bringing in their own dogs and cats," says Dr. Heers. "The clinic staff treat every animal as if it were their own."

The veterinary technicians hold small dogs recovering from anesthesia until they are fully awake, and Dr. Heers has owners stay with their dogs while anesthesia is induced. "The owners appreciate being there and the dogs are much calmer," he says.

Cross Street Veterinary Clinic began to participate in the Companion Animal Memorial Fund, which supports research at the Center for Companion Animal Health, in 1988, and is one of its leading contributors.

Dr. Heers says, "When a dog or cat dies or you must euthanize an animal who has been a personal family member for 10 to 16 years, it's a very traumatic experience for the owner." Memorializing the animal through the memorial fund seemed to him like a very positive thing to do, and his clients embrace it. They send notes and cards that indicate their appreciation for supporting CCAH research at UC Davis to help the next generation of pets live healthy, happy lives.

"It's a wonderful program," says Dr. Heers. "I think everybody should be doing it."


### Meet the Staff

**(Back row) Dr. Richard Heers, Sherry Johnson (receptionist), Samantha Ruiz (assistant), Tiffany Lerda (veterinary technician), and Marlene Pedro (receptionist);**

**(In front) Leeann Heers (veterinary technician) and Mary Avila (veterinary technician); Dr. Nancy Walton (class of '76, not shown) is the practice accountant.**

**(Left) Dr. Ralph Walton and Dr. Richard Heers**

CCAH update

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**www.vetmed.ucdavis.edu/ccah**

## Behavior Tip

*By Dr. Benjamin Hart, DVM, PhD, ACVB, Behavior Service Chief,*
*Veterinary Medical Teaching Hospital, UC Davis*

# Urine Trouble (You're in Trouble!)

Sometimes the nicest cats do the nastiest things. Such is the case when urine marking, better known as urine spraying, occurs.

Spraying is behavior we commonly associate with territorial marking by wild or domestic cats who live outside. When cats engage in this territorial behavior in our homes, the result can be anything from disconcerting to intolerable.

*Urine marking is one of the behaviors we refer to as being "hard wired" in the brain.*

Urine marking is one of the behaviors we refer to as being "hard wired" in the brain. While all cats carry the genes for urine marking, most domestic cats do not display the behavior.

Males are much more likely than females to engage in urine marking, even though neutering males reduces the likelihood to 10 percent. Among that 10 percent of neutered males, or five percent of spayed females, are the cats presented to veterinarians for problem urine marking. To get an accurate assessment of the problem, veterinarians begin a diagnostic workup.

Urine marking must be differentiated from house soiling—when a cat uses part of the house as an alternative toilet area—due to a change in litterbox habits. Urinary problems from disorders along the urinary tract must also be ruled out. Inadequate litter box sanitation may play a role, especially in females, but in studies supported by the CCAH, we learned that aggressive encounters between cats is the most frequent trigger for the onset of urine marking.

Treatment for urine marking involves approaches such as resolving intercat aggressive encounters that may trigger urine marking, maintaining a frequently cleaned litterbox and cleaning up old marked areas so they do not attract new marking.

Most instances of urine marking require administration of an anti-anxiety medication. Two CCAH studies reveal that anti-anxiety medications, such as fluoxetine and clomipramine are effective in resolving problem urine marking.

While some cats may respond very quickly to the medication, other cats may require treatment for two months or longer before the marking problem is resolved. Veterinarians usually adjust the dosage for each individual cat.

One aspect of the behavior still in need of research is the recurrence of urine marking after medication is withdrawn. The Behavior Service is currently seeking funding to embark on a study of the factors—such as the action of specific medications or medication withdrawal schedule—involved in urine marking recurrence.

CCAH update

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