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**PIONEERING A NEW FIELD:
A TRIBUTE TO DR. COLIN HARVEY
AND THE PENN VET DENTAL
AND ORAL SURGERY SERVICE**

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ABOUT THE COVER:

Dr. Colin Harvey, professor of surgery and dentistry, performs a feline teeth cleaning. In his 47 years at Penn Vet, Dr. Harvey has played a major role in helping the school reach a level of excellence in dentistry and oral surgery unmatched by its peers.



pioneering a new field

BY KATHERINE UNGER BAILLIE

In 1965, during his final year in veterinary school at the United Kingdom's Bristol University, Colin Harvey, BVSc, saw a notice posted on a bulletin board, advertising an internship in surgery at the University of Pennsylvania School of Veterinary Medicine. He decided to apply.

"I had no idea where Pennsylvania was," says Dr. Harvey. "I just thought it would be an interesting way to spend a year."

His stateside sojourn lasted longer than anticipated. In June, Dr. Harvey will retire after 47 years at Penn Vet, most recently as professor of surgery and dentistry in the Department of Clinical Studies-Philadelphia. His tenure has been marked by individual and institutional leadership in the development of a new field: veterinary dentistry.

Thanks to groundbreaking clinical and research discoveries, the development of training programs for veterinary students up through residents, and collaborations with experts inside and outside the veterinary world, Penn Vet has reached a level of excellence in dentistry and oral surgery untouched by its peers. The expertise in the School's Dentistry and Oral Surgery Service has translated into unsurpassed care for patients, connections that inform animal as well as human medicine, and further innovation that promises to grow and elevate veterinary dental medicine into the future.

"The vast majority of people who are our peers consider us the best in the world in veterinary dentistry," says Alexander Reiter, Dr. med. vet., chief of Penn Vet's Dentistry and Oral Surgery Service and an associate professor of dentistry and oral surgery. "We really are at the top of our field."

Dr. Harvey has played a major role in helping the school reach this level of achievement. In 1966 when he arrived at Penn for his internship year, however, veterinary dentistry did not exist as a distinct specialty.

"What became clear as I was going through my internship and stayed to do what became a residency," says Harvey, "was that no one else was interested in dentistry. It fell to me as the lowest person on the totem pole to pursue it, but I enjoyed it."



Dr. Harvey completed his residency in surgery in 1969 and joined the faculty as assistant professor of surgery in soft tissue surgery. As his surgery colleagues Robert Brodey, DVM, and Paul Berg, DVM, had primary interests in oncology and abdominal surgery, respectively, Dr. Harvey saw an opportunity to carve out his own area of expertise. He took “what was left,” as he puts it, which included either end of the patients requiring treatment: the rear end or the head and neck.

Making Connections

Though he was delving deeper into these specialties than his peers, Dr. Harvey did not do so alone. Collaborations with Dr. Berg and Joan O’Brien, VMD, a professor of animal medicine at Penn Vet, as well as others led to extensive advances and publications on ear, nose, throat, and anal and perineal conditions. But Harvey soon began to further specialize, narrowing to work primarily on the mouth. He quickly discovered that he and his colleagues were lacking basic information about how to treat problems of the teeth and gums in companion animals.

Luckily, help was just down the street, at the School of Dental Medicine.

Harvey reached out to his colleagues in the dental school, who would occasionally come to Penn Vet to look at cases and share tips about basic dentistry techniques. But their consults could only take the vet faculty so far.

“Dogs with raw mouths needed treatments, and often treatment consisted of extraction of teeth,” Dr. Harvey says. “At that time, extractions were done without appropriate equipment, because we did not know any better. The roots were left in and mouths ended up looking like warzones at the end of the procedures. There clearly was a need for improvement.”

Fortunately, the dental school was soon poised to offer more than intermittent advice. Penn Dental Medicine had been home to a program to train dental hygienists, which was slated to close as the University eliminated non-degree programs in the late 1960s and early 1970s. Because the cuts would leave tenured faculty in dental hygiene without a role to play, the dental school’s dean at the time, Walter Cohen, saw an opportunity for them to contribute at Penn Vet. Soon, registered dental hygienist Roberta Throne began working at Penn Vet, instructing vets on the best way to ensure animals’ teeth were cleaned properly.

“The result of having her here was an immeasurable improvement in the standard of care we were able to provide for dogs that had severe periodontal disease that was not severe enough to require extractions,” says Dr. Harvey. “By the time Roberta retired, it was clear that a registered (human) dental hygienist was an essential part of the Penn Dental Service team.”

That team now has two registered dental hygienists on staff. Dr. Harvey says their presence “ensures not only excellent patient care, but also excellence in conducting research that requires meticulously detailed scoring of teeth.”

OPERATORY

Plans are now in the works to further advance Penn Vet’s Dentistry and Oral Surgery Service with the renovation of the dental and oral surgical operatory. Upgrades to the digital radiography system, anesthesia equipment, storage space, and a treatment table are all part of the plans for the new facility. Negotiations are underway for donation of equipment. Donations to cover the other costs of the renovations are being accepted in Colin Harvey’s honor. The remodeled facility will bear the name “Colin Harvey Dentistry and Oral Surgery Operatory.” If you are interested in making a gift in honor of Dr. Harvey and the Penn Vet Dental and Oral Surgery Service, please contact Helen Radenkovic, Director of Development for the Ryan Hospital, at 215-898-2029 or hrad@vet.upenn.edu.





Dr. Michael Jennings (left) and Dr. Colin Harvey attend to their patient as a student looks on.

Formalizing a Discipline

Expertise in veterinary dentistry was growing at Penn Vet through the 1970s into the early 1980s, when the Penn Vet Dentistry and Oral Surgery Service was created out of the Soft Tissue Surgery Service, making it the first stand-alone dental service at a North American veterinary school. The Service offered endodontic, periodontal and restorative work as well as oral and maxillofacial surgery.

Meanwhile, Dr. Harvey took steps to augment the field on a larger scale, well beyond Penn's campus. In 1976, he was one of the founding members of the American Veterinary Dental Society, along with several private practitioners. This group lobbied for the recognition of a dental specialty in the American Board of Veterinary Specialties, achieving that aim in 1988 with the formation of the American Veterinary Dental College. Dr. Harvey also worked to grow the field in Europe and elsewhere, playing roles in the establishment of the European Veterinary Dental Society and the European Veterinary Dental College.

In addition to creating new institutions, Dr. Harvey also contributed a wealth of scientific and clinical publications, including approximately 70 chapters in textbooks, 130 papers in peer-reviewed journals, 100 abstracts and other papers on surgical or dental topics, and five books written, edited or co-edited on small animal surgery and dentistry.

His 1993 book *Small Animal Dentistry*, co-authored with Peter Emily, DDS—a human dentist who took an interest in veterinary dentistry and became a long-time collaborator of Dr. Harvey's—stands as a reference even today.

“Any time someone asks me what book I recommend in veterinary dentistry,” says Dr. Reiter, “I pick up Harvey and Emily's book. It may be 20 years old, but the information that is in there about the pathologies that can be seen inside and

around the mouth hold as some of the best described of any text in the field.”

Training Tomorrow's Practitioners

To keep pace with the advancement of the discipline, Dr. Harvey and his colleagues at Penn Vet have expanded offerings in dentistry to veterinary students.

“There are techniques in dentistry that, for many years, we as veterinarians were expected to know how to do without ever having been taught how to do them,” says John Lewis, VMD, an assistant professor of dentistry and oral surgery. “Now, an increasing number of vets will have the knowledge and experience to appropriately care for and advise their clients on their patients' dental needs.”

In the early 1980s, Penn Vet students were offered an elective program in dentistry, a world first. Penn Vet was also the first veterinary school to offer a clinical rotation in veterinary dentistry and oral surgery for fourth-year students, during which students learn how to do a thorough oral examination, take dental radiographs, professionally clean teeth, and perform extractions. Third-year students can take an elective lecture course, developed by Dr. Harvey, in which they learn everything from how to perform a professional dental cleaning to how to assess oral cancers. Students also engage in learning outside the classroom; each year, 30 to 50 students are enrolled in the student chapter of the American Veterinary Dental Society, attending lectures and participating in extracurricular workshops.

Starting in 1990, graduates with a desire to specialize in dentistry were able to continue learning in Penn's Veterinary Dentistry and Oral Surgery Residency Program—the first such program of its kind. Since its creation, 19 professionals have been trained and have become board-certified veterinary dentists, hailing from the U.S. as well as countries including Australia, Austria, Brazil, Finland, France, Germany, Italy, Japan and the United Kingdom. Dr. Harvey put a priority on training individuals from outside as well as inside the United States, hoping to spread the influence and weight of Penn's expertise in dental research and practice globally.

Among those who have gone through the program are Dr. Harvey's colleagues in the Penn Vet Dentistry and Oral Surgery Service, Drs. Reiter and Lewis. Dr. Reiter was persuaded to enter the program after giving a lecture on tooth resorption in cats at a conference in Denver in 1997. Following his talk, a man came up to him and asked to discuss his research over coffee.

When the man introduced himself as Dr. Harvey, “I was speechless,” Reiter says. “Dr. Harvey has an excellent reputation; he's been everywhere in the world, at all kinds of courses and conferences, so he's a world player.”

Just a few months later, Dr. Reiter was on his way to Penn.

Oral Health

Over the last couple of decades, Dr. Harvey has turned his focus largely on the question of how oral hygiene, oral health and general health are linked.

In human medicine, researchers and clinicians have for years identified clues suggesting that a relationship existed between periodontal disease and poor health, including increased rates of cardiovascular disease, diabetes and preterm birth. Dr. Harvey took up this line of investigation in animals, working for years to confirm a cause-and-effect relationship between the two. He's overcome obstacles in experimental design, as well as challenges inherent to working with canine and feline teeth—the size, shape and function of which are highly variable as compared to human teeth.

Only recently has he felt comfortable enough to accept he's found the first signs in dogs that the correlation may indeed be causation. In a paper in the 2011 *Journal of American Veterinary Medical Association*, Harvey, Penn Vet colleagues Jennifer Rawlinson and Alex Reiter, and others, reported on a study of dogs with gum disease.

“Our study shows that if you scale the teeth of dogs with periodontal disease and measure C-reactive protein, which is a protein produced when the body is stressed by disease or trauma, we've found that it goes down,” says Harvey. “It's the first rigorous study to suggest that the cause-and-effect relationship is real.”

Confident that more extensive studies will continue to confirm these findings, Dr. Harvey has worked to broaden awareness in the general public of the importance of oral hygiene for companion animals. His efforts have led to the creation of the Veterinary Oral Health Council, an organization which recognizes commercial products that meet standards for effective oral care in dogs and cats, akin to the American Dental Association's “Seal of Acceptance” on tooth-care products for humans.

“The more convenient we make it for pet owners to provide oral care for their animals on a daily basis, the more effective that care will be,” Dr. Harvey says.

Blazing New Trails

Looking to the future, Drs. Harvey, Reiter and Lewis see a world of possibilities for the veterinary dental profession, and for Penn Vet's role in it.

Together, Drs. Reiter and Lewis have been identifying new surgical techniques to tackle some of the most complex oral and maxillofacial injuries, spanning the range from maxillofacial reconstruction following gunshot wounds to repair of jaw defects from oral cancers. The implications for the advancement of both veterinary and human surgery are enormous.

“Dr. Reiter and I have continued to take advantage of the geographic proximity of Penn's other health schools, including the medical school, the dental school and the nursing school,” says Dr. Lewis.

Drs. Reiter and Lewis have, for example, worked with Penn

RECEPTION TO HONOR DR. HARVEY

Colin Harvey will be honored at a retirement reception on June 17, to which residents, interns, students and staff—past and present—are warmly invited. The event will also feature a continuing education program in veterinary dentistry and oral surgery. For more information, please contact Cheryl Arthur at carthur@vet.upenn.edu.

colleagues to develop a Comparative Oncology working group, in which they discuss cases of oral cancers and reconstructive efforts in humans and companion animals. Ongoing studies involve options for maxillofacial reconstruction in dogs. These discussions have led to concrete benefits for patients and new approaches to veterinary cases. In one case, clinicians at Penn Vet treated a dog with a gunshot wound to its face that had suffered a five-centimeter defect of its lower jaw. With input from Ara Chalian, MD, of Penn Medicine, Drs. Reiter and Lewis used a recombinant bone morphogenetic protein during surgery on the dog. That was in 2006; today, the dog is still doing well with its reconstructed jaw.

In addition, earlier this spring, Reiter began making connections in the hopes of furthering cross-university partnerships. In a talk at Penn Medicine, he presented on the comparative use of microsurgery between humans and companion animals.

“I proposed my idea of bringing together the schools of Medicine, Dental Medicine, and Veterinary Medicine to eventually create an interdisciplinary, comparative microsurgery teaching and research center,” Reiter says.

Another line of investigation by Dr. Lewis—research on treatments that may extend the life of cats with squamous cell carcinoma—may also have implications for humans.

“This has the potential to be a promising translational model,” Dr. Lewis says. “Squamous cell carcinomas are the number one oral tumor of both cats and humans.”

For his part, Harvey will remain active professionally with the American Veterinary Dental College and the Veterinary Oral Health Council. He sees potential for growth in zoo and exotic animal dentistry, as well as in equine dentistry, as animals live longer in captivity or as pets.

Dr. Harvey hopes his inroads in veterinary dentistry are only the beginning.

“There are so many areas of the field that require study because it's a young specialty,” says Dr. Harvey. “There is still a lot to be done.”

