

understanding of anatomy. The few studies that have been done in human and veterinary medical schools have shown no difference between students who dissected and those who did not with respect to grasping the concepts and being able to apply them. Modern human and veterinary medical schools appear to be moving away from requiring students to dissect and are using a multi-disciplinary approach to teaching anatomy, including electronic media and prosections. These are not only educationally adequate, they are cheaper and substantially reduce or eliminate cadaver use. If cadavers are needed, they can be acquired from ethical sources.²

B. Studies Demonstrate Efficacy of Prosection as an Alternative to Dissection

In a study published in the *Journal of Medical Education*, researchers found:

The statistical results of this study indicate that there were no significant differences in students' learning which could be attributed to the method of instruction, but that time could be saved if prosection, rather than dissection, were to be adopted as the required laboratory procedure.³

Another study published in the *Journal of Medical Education* found that students who learn anatomy through multi-media prosection tutorials score as well as students trained in traditional lecture-dissection programmes do. The researchers note:

Freshman medical students have been participating in an experimental multimedia gross anatomy program at Emory University for five years. The program includes audiovisuals, computer-assisted instruction, and tutorial sessions using prosected specimens. No lectures are given nor is dissection permitted. Experimental and traditional groups were compared by intramural written and practical examinations and by an extramural written examination prepared by the National Board of Medical Examiners and the Association of Anatomy Chairmen. Study of 35 intramural examinations given to five classes showed students in the traditional course with significantly higher performance in three examinations and students in the experimental course with significantly higher performance in six examinations. Neither group's performance was significantly higher on any extramural examination. It was concluded that, as measured by conventional examinations, students in the multimedia program with prosection tutorials learned human anatomy as well as those in the traditional lecture-dissection program.⁴

In another study published in the *Journal of Medical Education*, researchers described a viable alternative to animal dissection, noting:

Traditionally, human gross anatomy teaching has revolved around anatomical dissection. Unfortunately, during the last decade a number of

medical schools have experienced a decrease in the number of hours allotted to gross anatomy instruction compounded by a shortage of anatomical donors. This, in turn, has served to increase the difficulties of providing students with truly effective anatomical instruction. To help overcome this problem, a stereoscopic slide-based auto-instructional program has been developed as a substitute for dissection. Evaluation data suggest that this program, while having minor limitations in terms of anatomical orientation, does provide a viable alternative to dissection.⁵

Specifically regarding veterinary anatomical training, researchers concluded the following in a study published in the *Journal of the American Veterinary Medical Association*:

Analysis of performance in this course [in which prosection was compared with dissection] showed that veterinary students do not need to dissect every area to learn comparative anatomy effectively. Students made as many errors on structures that they learned by dissection as they did on structures learned from peer prosection. This finding is important for 2 reasons. First, learning by demonstration requires much less class time than does dissection (2 hours for dissection assignment vs 20 to 30 minutes for a demonstration). Second, the use of prosections can reduce the number of animals needed to teach gross anatomy.⁶

C. Veterinary Training Programmes Can Successfully Employ Ethically Sourced Cadavers

In a study published in the *Journal of Veterinary Medical Education*, researchers described their successful implementation of an ethically sourced cadaver programme:

A donor program for procuring dogs and cats to meet the needs of anatomical instruction was initiated six years ago at Tufts University School of Veterinary Medicine. The program was initiated in order to comply with state regulations that preclude the use of shelter animals and to satisfy ethical objections of students and faculty. The donor program has successfully met the animal needs for teaching gross anatomy and, in addition, provides opportunities to integrate clinical perspectives and ethics beginning from the first year of veterinary education.⁷

Lara Marie Rasmussen, DVM, DACVS – assistant professor at the College of Veterinary Medicine at Western University of Health Sciences – states:

[The College] will rely solely on a Willed Body Program for all cadaver accessions used in the curriculum. All animals will have died or been euthanized due to serious illness or injury. Animals without guardianship [who] are killed secondary to the “over-population problem” will not be included in our Willed Body Program. We are at a point in human

civilization where we need to ethically account for our actions. Human medical training has relied on and benefited from Willing Body donations for eons. We as veterinarians must show the same respect for our patient populations. We must no longer kill or rely on suspect means to fill our cadaver labs.⁸

D. Multi-Media Programmes Aid in Veterinary Anatomical Training

On its website, Colorado State University states:

In the past few years, Colorado State University's veterinary program instituted the use of interactive multimedia to teach anatomy. This DVD program, Virtual Canine Anatomy, affects not only the classroom but also extends beyond the campus to the student's home. The DVD program provides an interactive source of information that extends the presence of the "instructor" beyond scheduled class times. The program allows the luxury of self-paced, individualized learning. It also provides a focal point around which the instructor and student can exchange ideas and make interpretations of course content. Research suggests this program is an effective tool to enhance the study of anatomy Veterinary students around the world are now reviewing this program.⁹

2. Stop obtaining and kennelling animals for use in anaesthesiology teaching laboratories. Instead, teach anaesthesia techniques using modern computer programmes and during clinical patient care.

A. Veterinary Expert Finds No Pedagogical Need to Subject Healthy Animals to Anaesthesiology Procedures

Dr Buyukmihci writes:

Anesthesiology can best be taught by a combination of computer programs and patient care during the students' clinical training phase of their program. The studies that have been done have shown that the students trained in this fashion are as good or better at anesthesia than their counterparts trained in the traditional method of using healthy animals repeatedly.¹⁰

B. Studies Detail Efficacy of Interactive Computer Simulations in Teaching Anaesthesiology

In a study published in the *Journal of Veterinary Medical Education*, researchers concluded:

Second-year veterinary medical students used an interactive videodisc simulation as part of the curriculum in an introductory principles of anesthesia course. Subjective responses to a questionnaire filled out

immediately following their first-use experience indicated a positive response regarding the simulation's realism, clarity, and ease of use. Upon entering the third year, the same students prepared for an introductory clinical anesthesia laboratory either by using the simulation, or by attending a 50-minute lecture/discussion. A comparison of test scores indicated no significant difference in academic performance between treatment groups on either of two laboratory days.¹¹

In another study published in the *Journal of Veterinary Medical Education*, researchers found that students who learned veterinary anaesthesia through problem-based anaesthesia case simulations had test scores equivalent to students who learned anaesthesia through conventional methods. The researchers note:

A number of interactive, problem-based anesthesia case simulations (ACS) were designed as part of the veterinary anesthesia course. The ACS cover a range of different disease syndromes, different species, and related anesthetic challenges including a dog with head trauma, a foal with a ruptured bladder, a horse with colic, and a Great Dane with bloat. Each case includes an introduction to an animal and its disease history, specific pathophysiology, and actual anesthetic techniques. A significant effort has been made in all of the cases to maintain participant interest with animation, graphics, and required interaction. These simulations allow the student to manage difficult cases [sic] and associated problems that may occur. The diagnostic and therapeutic choices help to develop problem-solving techniques and reinforce important facts to be retained. Poor case [sic] management is marked by patient death, arrhythmias, or other less than optimal outcomes. A good choice is usually followed by a good outcome, but in some instances another problem will develop despite the best of care, just as in real life. ... Student performance in the final exam was equivalent to that of conventionally taught students from the previous year.¹²

C. Studies Detail Efficacy of Teaching Anaesthesiology During Clinical Examinations

In a study published in the *Journal of Veterinary Medical Education*, researchers at Texas A&M University detail the recent establishment of two pre-pubertal gonadectomy programmes in association with area humane organisations as an addition to its required elective surgery rotation for fourth-year veterinary medical students. The researchers found:

Results of a student questionnaire indicate that the addition of these programs enhances their education experience in several ways including: 1) refinement of surgical skills in certain areas including gentle tissue handling and hand-eye coordination; 2) exposure and practice in perioperative and anesthetic management of pediatric patients; 3) increased awareness of the functions, goals, and activities of humane

organizations; and 4) increased understanding of the pet overpopulation problem and the unique role of the veterinarian in combating this problem.¹³

In another study published in the *Journal of Veterinary Medical Education*, researchers found that students' performance during fourth-year anaesthesia rotations was not affected by switching to a more humane alternative training method:

The small animal surgical faculty have noted that students from the alternative surgical laboratory program are more timid and hesitant the first time they incise living tissue. This hesitancy is only apparent on the first live tissue surgery. In all other segments of the 4th-year small animal surgery and anesthesia rotations, including patient care, the alternative students perform on a par with the students from the standard laboratory experience.¹⁴

3. Stop obtaining and killing animals for use in the Intro to Clinics I course. Instead, use alternatives currently used at Western University of Health Sciences. Zarah Hedge, DVM (class of 2009 at Western), explains:

Clinical skills practice often includes the use of a variety of models. Some of the models/activities we use include the following:

- DASIE (Dog Abdominal Surrogate for Instructional Exercises) and fake skin to practice suture patterns
- We have fake intestines, which we use to practice surgery and suture techniques
- Animal models (extremities and neck) to practice venipuncture, catheter placement & bandage techniques
- Rescue Critters to practice intubation and resuscitation techniques
- One model, called 'Leaky Fella', enables us to practice ligation techniques
- We have an equine model for rectal palpation; the intestines are plastinated
- 'Palp-a-Pet' is a stuffed animal model we use to practice palpation & pathologic description skills
- We use our cadavers (from the WAVE program) to practice several techniques, some of which include biopsy, skin scraping, lump removal, dentals, drain placement, and intestinal resection & anastomoses
- We use our own animals ... for clinical activities as well, including ophthalmology techniques, microchipping, and auscultation practice.¹⁵

4. Stop obtaining and killing animals for use in Small Animal Surgery and Large Animal Surgery courses. Instead, use a combination of ethically sourced cadavers and non-terminal surgeries on live animals who would benefit from the procedure(s).

A. Veterinary Schools in the United Kingdom Do Not Perform Terminal or Needlessly Invasive Surgeries for Training Purposes

Terminal surgeries on healthy animals are illegal in the United Kingdom. Freda Andrews, head of education at the Royal College of Veterinary Surgeons in the UK, states:

Veterinary students [in the United Kingdom] do train with both live and dead animals, but the difference is that their training with live animals is on real clinical cases which are being seen in the university clinics and hospitals. Undergraduate students and interns/residents undertaking postgraduate training in the universities may undertake various procedures under the supervision of other qualified vets/specialists, but it is not considered ethically acceptable in the UK for otherwise healthy animals to be anaesthetised and used solely for training purposes for vets (sometimes referred to as terminal surgery). Dead specimens will be used for training purposes, but these will have been acquired through normal channels (eg, post-mortem or abattoir specimens; animals euthanised for other reasons, etc) and would not be animals specifically killed for the purpose.¹⁶

B. Veterinary Expert Suggests That Ross Implement Mobile Veterinary Clinic to Train Students in Surgical Techniques

Dr Buyukmihci writes:

There is little question that the art of surgery can be taught effectively and humanely, without resorting to killing animals or doing surgery on those animals who do not need it. It must be understood that the surgical training veterinary medical students receive prior to obtaining their degree does not make them surgeons. At best, for the average student, it may increase their confidence as it initiates them to the complexities of surgery. Furthermore, the emphasis in this training is on principles rather than specific procedures per se. Therefore, any program that would accomplish this should be acceptable.

Numerous studies have shown that purposeful killing of animals to teach surgery is not only unnecessary, it may be counterproductive. Many veterinary medical schools in the United States have done away with fatal surgeries. Their reasons for doing so are educationally and ethically based. They now use a combination of ethically-sourced cadavers and live animal surgery on individuals who will benefit from this. In the latter case, this is primarily orchietomies (castrations) and ovariohysterectomies (spays) of

animals who then are put up for adoption. The spay is particularly good for surgical instruction because it combines most of the principles of tissue handling that the student must learn. I have been told by others that Ross University does not have animal shelters as a resource for this purpose. Because there apparently are numerous stray cats and dogs on the island, however, it seems to me that the school could employ mobile veterinary clinics for training purposes in a trap, sterilize and release program or something similar. This way of training would help the community, the animals, and the students.¹⁷

C. Studies Demonstrate Efficacy of Numerous Humane Surgical Training Models

In a study published in the journal *Veterinary Surgery* that compared students' proficiency in learning surgery on anaesthetised dogs (as opposed to cadavers), researchers concluded, "No statistically significant differences could be detected between the two groups [of students, with respect to skill, outcome]".¹⁸

With regard to animal fracture fixation laboratories, you opined in the *Journal of Veterinary Medical Education* that "students' self-confidence is greatly increased after working with the plastic models. Their motor skills and comprehension of the biomechanical principles of fracture fixation and implant application are superior to those resulting from the use of live animals laboratories only".¹⁹

A study published in the journal *Veterinary Surgery* described the development of parenchymal abdominal organ models for use in teaching veterinary soft tissue surgery:

Models of the canine spleen, kidney, and liver were made from soft plastic to simulate the organs of the live animal as closely as possible in appearance and tissue handling properties. Each organ model was independently evaluated by five small animal surgeons who performed several common surgical procedures on each model. All models had a realistic appearance and, with the exception of one tissue handling problem with the kidney model, and one with the liver model, tissue handling properties of the models were comparable to those of the organs in the live animal. All models were useful for teaching each of the procedures evaluated.²⁰

In a study published in the *Journal of Veterinary Medical Education*, researchers discuss the successful modification of the university surgical training curriculum – to meet animal welfare and student conscience concerns – that have been met with approval by faculty and students. The researchers note:

At The University of Illinois, we have made humane issues a priority in our surgical teaching program and we have taken a pro-active attitude. ... Over the next few years, our surgical laboratory curriculum will continue to evolve to the point of having no nonsurvival surgical laboratories. The

elective neutering procedures on humane shelter animals will be used for all instruction of live-animal surgery and postoperative patient care during the 3rd-year surgical laboratories.²¹

Another similar study found that there were no significant differences between training veterinary students in surgical techniques by using models of live animals.²²

In a study published in the journal *Veterinary Surgery*, researchers found that certain reusable plastic models might actually be more effective than cadavers in teaching basic surgical skills and ovariohysterectomy in dogs.²³

In a study published in the *Journal of Veterinary Medical Education*, researchers found that DASIE is an effective alternative for preparing students for live surgery and that it is well received by the students.²⁴

In a study published in the *Journal of Veterinary Medical Education*, researchers detailed how service learning has become a widely used tool for education in many public schools, colleges, universities, and professional schools and that it has the potential to be more widely used in the education of veterinary students.²⁵ The College of Veterinary Medicine at Texas A&M University has relied on service learning in association with area humane organisations for many years in the fourth-year veterinary curriculum as a method of instructing students in techniques of veterinary surgery. Recently, the service learning programme has been expanded to support the laboratory portion of a required third-year surgery course. The mechanics of both the fourth- and third-year service learning projects are described in detail in this study. Additionally, the key components of successful service learning programmes are discussed, as are the benefits derived from the service learning projects at Texas A&M University.

In a study published in the *Journal of Veterinary Medical Education*, researchers found that models are a superior alternative to the use of live animals for teaching basic motor surgical skills. The researchers note:

The use of large and in some cases unrealistic models were superior to live animals for demonstrating basic concepts and allowing the students to gain basic skills. ... Students readily accepted alternative models as long as clinical relevance had been demonstrated by the instructor. ... Basic psychomotor skills that are essential to the surgeon can be learned with inanimate models. In addition, motor proficiency can be achieved with repetition on models, making the use of models a superior alternative to live animals for learning basic motor skills.²⁶

In another study published in the *Journal of Veterinary Medical Education*, researchers discuss in detail the methods for teaching surgery by using veterinary patients who will benefit from the procedures performed.²⁷

In a systematic review of comparative studies examining alternatives to the harmful use of animals in biomedical education, researchers “systematically review[ed] the published literature for controlled studies comparing learning outcomes of traditional methods that require the terminal use of animals (eg, dissection, live-animal surgery, and live-animal laboratory demonstrations) with outcomes obtained with alternative teaching methods”.²⁸ They found that the use of alternatives did not hinder students’ education and skill acquisition, and they concluded that “the results seem to support more widespread adoption of alternative teaching methods in biomedical education”.²⁹

In a study published in the *Journal of the American Veterinary Medical Association*, researchers assessed the outcome of the alternative medical and surgical laboratory programme at Tufts University. The surgical procedures assessed were “Ovariohysterectomy, Castration, Laceration Abscess, Laparotomy, Gastrotomy, Eyelid surgery, Cystotomy, Intestinal anastomosis, Splenectomy, Gastric torsion/Gastropexy, Simple fracture repair, Cast/Splint application, Thoracotomy, Other”, and the medical and diagnostic procedures assessed were “Transtracheal aspirate, Urinary catheterization (male), Urinary catheterization (female), Bone marrow aspiration, Venipuncture, Needle aspirate, True cut needle biopsy, Ophthalmic examination, Otic examination, Cerebrospinal fluid tap, Cystocentesis, Venous catheter placement, Other”.³⁰ The researchers concluded, “Our results suggest that the use of cadavers during the third-year laboratory program, when supplemented with additional clinical training during the fourth year, can provide training comparable to that provided in a conventional laboratory program”.³¹

In a study published in the journal *Veterinary Surgery*, researchers evaluated the use of video footage and a simulator for instruction of basic surgical skills and found:

Students who practiced with simulators performed significantly better as surgeon and assistant, and in total psychomotor skills evaluation, [than] students watching the video only. Students using simulators performed ligation with significantly more accuracy and tended to be more expeditious at this task.³²

D. Novel Perfused ‘Living’ Cadaver Model Can Replace Needless Terminal and Invasive Surgeries in Animals for Training Purposes

Ross can also use a novel patented training method on “living” cadavers that was developed by Dr Emad Aboud at the University of Arkansas for Medical Sciences. In his study published in the journal *Alternatives to Laboratory Animals*, Dr Aboud describes how his model can replace the use of live animals for veterinary surgical training:

The vessels in a cadaveric specimen were connected to artificial blood reservoirs. The arterial side was connected to a pump to provide pulsating pressure inside the arteries, while the venous side was kept under static pressure that applied to the reservoir. This method provides a condition that simulates live surgery in terms of bleeding, pulsation and liquid filling

of the vascular tree. It is an excellent alternative model and can be applied to the whole cadaver or to a particular cadaveric specimen (head, arm, leg) or to an isolated organ. It is distinctive and of a great practical value for training in a wide range of surgical procedures. . . .

This model adds a new dimension to microsurgical training and increases the usefulness of training courses by enabling the practice of many surgical procedures and techniques simulating real live surgery that is richer and superior to using plain cadaveric specimens or anaesthetised animals. Adopting this technique could forever eliminate the use of live animals in both human and veterinary surgical training.³³

Dr Aboud's model has been endorsed by Dr MSA Kumar, professor of biomedical sciences at the Tufts School of Veterinary Medicine, who notes, "[M]y interest being in Veterinary Medicine, I strongly recommend that Dr Aboud's model be given every consideration for implementation. Veterinary surgeons under training will benefit tremendously by adapting this model. . . . I particularly like the idea from the animal ethics perspective, as Dr Aboud's model would do away with terminal surgeries on live animals".³⁴

Dr Daniel Smeak, professor of surgery at Ohio State University's Department of Veterinary Clinical Sciences, wrote: "I see [Dr Aboud's model] as a highly useful tool to help train our own veterinary surgery students using animal cadavers. It was astonishing to witness a demonstration of this perfusion system, as it was nearly impossible for me to distinguish whether the subject was alive or deceased. . . . I am sure you will agree that there are many possibilities for his training system in our field".³⁵

E. Needless Terminal and Invasive Procedures Performed on Animals in Ross' Curriculum May Violate St. Kitts' Protection of Animals Act

Since it is possible to achieve adequate veterinary training while also banning terminal and/or non-beneficial surgeries on healthy animals, Ross' continued insistence on requiring students to perform multiple needlessly invasive and terminal surgeries on animals may violate the St Kitts Protection of Animals Act, which – according to (Sgd) Jihan Williams (Crown Counsel for Hon Attorney General, Minister of Justice and Legal Affairs in St Kitts) – "criminalizes a number of activities which may occur during animal research or teaching, such as causing any unnecessary suffering to the animal without reasonable cause or excuse or subjecting the animal to any operation which is performed without due care and humanity".³⁶

5. Stop performing repetitive rectal palpations on steer. Instead, use the Bovine Rectal Palpation Simulator.

The University of Florida cautions that "care should be taken when performing rectal palpation of cattle because the rectum can be torn or otherwise damaged".³⁷ In the United Kingdom, animal welfare guidelines limit the number of examinations allowed per cow,

and this reduces the opportunities to practice rectal palpation. As a result, researchers developed a Bovine Rectal Palpation Simulator in which the following is true:

[T]he student palpates virtual objects representing the bovine reproductive tract, receiving feedback from a PHANToM haptic device (inside a fibreglass model of a cow), while the teacher follows the student's actions on the monitor and gives instruction. We present a validation experiment that compares the performance of a group of traditionally trained students with a group whose training was supplemented with a simulator training session. The subsequent performance in the real task, when examining cows for the first time, was assessed with the results showing a significantly better performance for the simulator group.³⁸

We urge Ross to reconsider its needless use and indiscriminate killing of animals, especially when all British veterinary schools – and many veterinary schools around the world – effectively train their students without resorting to harmful teaching methods.

The law in St Kitts forbids “unnecessary suffering” of animals, yet this is exactly what is happening at Ross: animals are suffering in invasive procedures and are being killed for no acceptable reason.

Will you please respond by **29 January**? If you have any questions, I can be reached via e-mail at ShalinG@peta.org or by phone at 757-962-8325 (US). Thank you.

Sincerely yours,



Shalin G Gala
Senior Researcher

cc: Thomas C Shepherd, President, Ross University
Daniel Hamburger, President, CEO, DeVry Inc

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