

EFFECTIVE TEACHING METHODS FOR VETERINARY SURGERY

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Introduction:

“A good teacher can inspire hope, ignite the imagination and instill the love of learning”
---Brad Henry

Educating future generations of veterinarians is one of the privileges and obligations of the clinical teachers. Unfortunately, veterinary clinical teachers first enter the classroom without having been trained in the art and science of teaching. Students are still taught predominantly using centuries-old methods that make them passive recipients rather than active seekers of knowledge. Lectures are a convenient way to convey large quantities of information but an imperfect way for students to learn. This is detrimental to reflective and critical thinking.

In veterinary and human medicine, clinical and surgical training has relied for many years on an apprenticeship type model, where the trainee shadows a more experienced surgeon, initially watching the expert and then performing the procedure under the expert's supervision. This approach still plays an important part in veterinary training but, as students have fewer opportunities to practice and surgeons are busier, there is a need to develop new approaches to complement the traditional methods. There are also ethical issues to consider and with increasing public awareness there is resistance to trainees practicing surgery on real patients.

Changing Scenario:

To improve the student's learning process, some colleges are beginning to address the situation by converting lectures to seminars and workshops, the so-called “flipped” classroom in which students assume active leadership roles and faculty serve as coaches. This way, students also learn communication and negotiation skills. This is an exemplary model for training future professionals.

Some medical schools have introduced a “clinical immersion” approach, which teaches basic medical science through the solving of clinical problems—for example, one learns practical anatomy and physiology from a patient, not a book. This vertically integrated, problem-solving approach is a major advance in biomedical education.

In the recent years, there is a tremendous increase in the number of private clinics and full time veterinary practitioners. Veterinary colleges have an increasing role providing specialist referral services to the profession, and consequently the proportion of first opinion cases that students encounter at university will be decreasing. Further, delivering veterinary surgical teaching and training for knowledge and surgical skills is becoming increasingly challenging. Student numbers have risen, which places extra pressure on both intramural clinical teaching/rotations and extramural studies (EMS) as learning opportunities.



Another way to make clinical/ surgical education more relevant is via distributed, community-based surgical experience. Teaching hospitals with less and diminishing caseloads augment with offsite training. Studying outside the academic campus is an excellent way for students to develop real-world, hands-on experience with a wide variety of animals, owners and communities. Few new veterinary colleges in North America have decided not to construct a teaching hospital on campus but to use community-based clinical and surgical training instead. However, distributed education requires excellent oversight.

Soon, veterinary students may study anatomy on virtual dissecting tables and learn surgical techniques on virtual operating tables rather than on cadavers and patients. Advances in distance diagnostics (telemedicine) will effectively serve teaching and animal health needs in any location. The immense computer power of the future, coupled with advanced informatics and 3D printers, will allow us to manufacture customized prosthetic devices and possibly even create new tissues and body parts.

Surgical Teaching in a Didactic Mode:

Discussion on 'Effective Teaching Methods for Veterinary Surgery' begins with a philosophy or at least a clear understanding of what one wants to impart to students and what are the expected learning outcomes. Hence, teachers should facilitate learning and clinical thinking / acumen.

The goal of surgical teaching is to produce competent specialist surgeons who are critical thinkers and can function independently. The way to improve teaching of surgery in the classroom is instead of just lecturing, making it as an interactive session for example: from converting lectures into seminars, workshops and interactive by using devices like clickers.

Although over the years the emphasis is mainly on information giving, it is ideal to inject some clinical thinking in the didactic lectures. Some methods of doing this are: to ask clinically orientated questions, give a problem list and asking to arrive at differential diagnosis, similarly a list of differential diagnosis for the particular disease /condition being studied and ask how to differentiate between the items on the list, encourage students to produce such list of each disease studies and to go through that process, the simple clinical scenarios.

Self-learning under supervision for example: Problem Based Learning (PBL) is effective through Small Group Discussion (SGD). The role of the facilitator would be to create the learning environment and motivate students.

The important duty of the lecturer teaching through didactic mode is to determine learning objectives, which include the following: Preparation for entry level practice, to consider the course in the context of the whole curriculum, relevant to goal of entry level surgical competency, application of knowledge, focus on the overarching competencies viz: history-taking, physical examination skills, identifying problems, differential diagnosis list, diagnosis work-up, interpretation, formulating treatment and surgical plans, communications with clients and staff, promote critical thinking, decision-making and instill the behavior of lifelong learning, facilitate the transition to being the surgeon and create opportunities for students to be the surgeon. Choose teaching techniques that will promote the learning objectives. Student-centered



learning promotes development of critical thinking, independency, lifelong learning communication skills and teamwork skills.

Surgical Teaching in Clinics Floor:

It is important to appropriately arrange sessions for students' orientation before they start surgical rotation. This will include grouping/ regrouping, talks on group dynamics, effective surgical team, communication and writing skills and even on the importance of health & nutrition during clinical training programme particularly, long hours of work in the day/ night experiencing stress which the students are not exposed to.

Some of the techniques/ methods to adapt to improve teaching of surgery and surgical training in clinics floor are: motivating students to discuss on cases individually or as a group (SGD) to arrive at diagnosis, implementing day 1 clinical competencies and other simple and effective methods viz: display of 'Surgical Case of the week' (progressive disclosure), 'X-ray of the week', 'What is your Fracture plan?' etc.

Rounds: Teaching opportunities in the clinic rounds include topic rounds, case rounds, daily interactions and role modeling. Topic rounds are good way to consistently address specific content in each rotation and mostly a teacher-centered lecture. In case rounds, the patient is a vehicle for exploring many different aspects of case management, relevant and easier to promote application of knowledge. Teachers need to be aware of the conscious and unconscious components of learning from role modeling, so that the net effect of the process is positive. During rounds, it is important for the surgeon to share the clinical experiences, to discuss alternative case management strategies and decision-making, to discuss financial and business aspects, which are critical to success in practice, and to encourage active discussion. To emphasize Knowledge, Skill, and Attitude (KSA) which have been shown by research, and which educators embrace, to be significant factors that influence students learning.

Approach to patient care: The first lesson, history taking is one of the arts in the practice of veterinary medicine. A student should always be attached to the hospitalized patients and will carry out the management and treatment under supervision and communicate with the owners. All the hospital procedures and treatments have to be based on the standard operating procedures (SOP). When confronted with a clinical case in clinics floor, the emphasis is on developing clinical acumen. Ideal approach is to assist students to think and function clinically, ie to develop clinical acumen.

Teaching in the Operating Room: It is the corner stone of surgical education. Teachers must constantly balance the quality and safety of patient care with the learner's need to make independent decisions and gain hands-on-experience. Much surgical education continues in an informal setting, during brief, impromptu educational encounters in the OR. Scaffolding is a teaching strategy that involves conscious or unconscious individualized support during surgery relative to a trainee's abilities. Although the OR remains the most widely used format for teaching surgical skills, the number of hours that UG students spend in the OR continues to be less. Surgical mentors must seek every opportunity to direct, critique and actively teach in the OR.





Clinical case discussion: Clinical case interaction/ discussion happen between two students, within a small group of students, between clinician and a group of students, within a large group of students, during ward rounds, grand rounds, clinical case conference and inter campus clinical interaction between students through video conferencing. For all these activities, students should be asked to keep a journal of cases, seen in which they login the KSA for each case, a very good methodology to foster and enhance clinical learning.

Day 1 Clinical competencies: Specific and listed 'Day 1 clinical/ surgical competencies' to be mastered by the student on surgical rotation should be made compulsory. The clinician/ surgeon should certify that the student is capable and confident in executing a particular competency to complete the program. A Booklet on 'Day 1 Clinical Competencies' kept with the individual student will assist this process.

Teaching at Surgical Skills Lab:

Teaching skills through Surgical Skills Laboratory is the base for further training at clinics. Humane teaching methods are to be followed through high quality videos/computer simulations, ethically sourced cadavers, preserved specimens, non-invasive self-experimentation, models and simulators (mannequins or virtual patients for surgical training) and supervised clinical/surgical experiences.

Surgical training: Even though, years of experience have proven that most aspects of surgical training can only be learned by exposure to real patients in real physical environments, there are other things that can be more easily learned on simulators. Students have access to a safe, flexible and accessible learning environment where they can practice repeatedly in a standardised setting. If used appropriately, simulators are a valuable complement to traditional training methods and enable students to make more effective and efficient use of clinical cases as learning opportunities. Alternative veterinary surgical training is through simple knot-tying boards, plastic organs and similar models: basic manual skills such as suturing and instrument handling, ethically sourced cadavers, simulated surgery, real patients: observing, assisting with, and then performing beneficial surgery under close supervision (e.g. shelter animal neutering). A student should always be a part of surgical team operating on clinical cases.

The future will have computers not only involved in the training of surgeons, but also in the planning of surgery and the aiding of performance in the operating room. More recently, volumetric data obtained from computer-aided scans have provided three-dimensional information for the surgeon to assist in planning complex operations. Using a computer simulator for planning, a surgeon may "try out" many possible reconstructions on a patient-specific model prior to operating.

Surgical models developed include the Dog Abdominal Surrogate for Instructional Exercises (DASIE), which students can use to practice handling surgical instruments, suturing and placing ligatures. A hollow organ simulator is used for performing gastrotomies and hollow organ closure. Other surgery simulators include, one developed for canine ovariohysterectomy, another for practicing various surgical procedures on the spleen, liver and kidney etc. Canine plastic bones (Saw Bones) are available for teaching orthopaedic surgery for many years. A model horse is used for bandaging, rugging and tacking up. A model cow is used to learn how to put on a

halter or apply a rope for casting. An equine colic model has been developed with a fiberglass rear-half of a horse containing plasticised preserved intestines and plastic models of other organs. Endo trainers are used to learn and practice endoscopic and laparoscopic surgical skills. Simulators are also used for assessment in certain OSCE (Objective Structured Clinical Examinations) stations.

Haptic simulators: A relatively new area of simulator development involves computer technology that provides haptic (touch) feedback as well as graphic representations. In a simulation enhanced with haptic technology, the trainee interacts with a computer-generated virtual environment and can feel the softness or firmness and appreciate subtle variations in the shape and size of the organ or structure. Haptic Cow was developed for teaching bovine rectal palpation. As the student palpates, the instructor can follow the hand movements on the computer monitor and guide the examination. The students practice communication skills, history taking, and have to make a diagnosis and decide on the treatment plan. All must be delivered in a way that the 'farmer' understands and in real time. Another one has been developed for teaching rectal palpation of equine colic cases. Models are being developed for teaching palpation of the canine prostate, feline abdomen etc.

Ideal Learning Environment:

Learning environments that are positive and supportive promote learning. Teachers' attitude and behavior have a profound effect on the learning environment and student motivation. The ideal learning environment includes safety, less stress, encourages fun, permits practice, accessibility, allows mistake and provides immediate feedback. Creating a safe learning environment is by clearly articulating expectations, the teacher being consistent, fair, understanding when appropriate, respect students time, allowing extension on medical records when no sleep due to emergency etc. Also encourage questions, encourage students to take risks, cheer leader, protect patients from serious mistakes and encourage teamwork. Make learning fun and engage the students.

Show genuine concern for each student and he/she will put forth greater effort, treat students as individuals, be compassionate, respect your students, treat each student fairly and equally. Mutual trust is critical in the student-teacher relationship. Treat your weakest student as you treat your best student. Avoid bias, try not to let pre-conceived perceptions about a particular student's abilities or performance affect your expectations of that student.

Maintaining standards are critical. Set high standards, clearly articulate your expectations and be consistent in enforcing standards.

Challenges to Clinical/ Surgical Teaching: Limited control over schedule, unpredictable caseload, emergencies, client demands and dependence on others, multiple groups of students with differing needs and concurrent demands on teachers' time viz: meetings, lectures, labs etc.

Role and Attributes of Clinical Teachers:

Exact definition of an effective clinical teacher remains contested. However, for a "good" educator, teaching should not merely be a display of knowledge but the process of identifying areas for learning and deciding on interventions that stimulate the learning process. Clinical



teacher has to simultaneously excel in the areas of clinical service, teaching, research and administration. These efforts appear to commonly occur at the expense of teaching.

Competence, knowledge, enthusiasm in their professional activities, availability for students, good communication skills, effective in time management, respecting students' independence, welfare on patients, flexibility and the will to excel in diverse fields are among the most important desirable attributes of a clinical teacher.

Conclusions:

Clinical practice-based surgical teaching and training is an applied, social and high impact element of the veterinary teaching. Within this context, students are learning 'on the job' with clinical educators/ surgeons who are carrying out their professional duties whilst at the same time supporting learning.

To equip surgeons with role awareness and general teaching skills it would be ideal for all to have access to basic teacher training which could be arranged through face-to-face workshops or online self-directed learning.

Successful teachers are not only knowledgeable and clinically competent, but exhibit effective communication skills and have an inspiring, supportive and inclusive student centered approach. Apart from above, which are mandatory requirement for a clinical teacher, most attributes that are considered important are general human characteristics that can be developed by means other than discipline-specific training or knowledge ("non-cognitive skills").

For veterinarians of the future, core surgical competencies represent a set of skills, knowledge and attitudes necessary for the entry-level veterinary practice and this lies within the responsibility of teachers and hence, it is the need of hour to adore the advancements and positive changes happening in surgical teaching and training.

"It is no use saying 'We are doing our best.' You have got to succeed in doing what is necessary."

---Winston S. Churchill

