**InterNICHE**

**DVM: Training the Animal Doctor**

**Surgery and the SynDaver Canine**

Full episode

Official transcription

InterNICHE presents

DVM: Training the Animal Doctor

a documentary film series

Surgery and the SynDaver Canine

case study

Dr. Galina Hayes (00.22)

My name is Dr. Galina Hayes. I'm an assistant professor at Cornell University. I work in the soft tissue surgery section, and my responsibilities include providing service to clients and animals coming to the hospital, either on an elective or emergency basis, requiring soft tissue surgical procedures; as well as training the students, both the third and final year students, in the theory and practice of surgery.

(00.50)

Veterinarians are expected to know and do a lot and have a grasp of a very wide range of skills, which in my opinion, may not be entirely realistic to expect them to accomplish within four years. And certainly a veterinary surgeon in their surgical skills will cross multiple species, so a general or mixed practitioner will often be doing surgery on four, five, six different species.

(01.15)

They need to know the anatomy of all of those different species, their different pathophysiology, healing characteristics, you use different instruments.

(01.23)

And yet their exposure to hands-on surgical training may be limited to just a few weeks in their final year of their DVM training. And within those final weeks there may not be that many opportunities for direct mentorship. People that are undertaking specialist training for surgery on humans will undertake first an internship, then a second internship, then a residency.

(01.53)

And only after they're into their residency, would they actually be considered basically competent to begin to perform surgery. Whereas of course in the veterinary world, we leave and are expected to be surgically competent at the end of just our basic DVM training.

(02.11)

And while I don't expect that to change anytime soon, I think we can change the way we deliver that training through the DVM programme to try and make sure that the skill set that our graduates are equipped with is a little bit closer to what they're expected to have.

Dr. Brad Case (02.27)

Within the sophomore surgery course, the course that I co-ordinate, I have tried to focus on clinically important, practical, concepts, techniques, knowledge. What is going to make a difference for my patient? For example, GI surgery: very, very commonly performed. Dogs eat rocks and toys, and they plug up their guts and then they need to have surgery.

(02.56)

If you don't do the surgery correctly, there is a good chance they're not going to survive, because they're going to leak the contents of their bowel into their abdomen. And they're not going to survive that unless they have emergency surgery, and even then sometimes they don't survive.

(03.10)

So I'll spend a lot of time talking to them about how do you properly assess the bowel, to make sure that you've got healthy tissue that you're bringing together, and how do you suture it together correctly? Because you can suture it together incorrectly, spend a lot of time doing it, feel good, and have a failure.

Dr. Galina Hayes (03.26)

And so I certainly was very aware in the early parts of my career of how much I would appreciate face to face mentorship and someone delivering and improving my hands-on surgical skills.

(03.40)

And so kind of carried that thought forward into my teaching career and really began that process of developing that training from the perspective of how can we teach a hands-on skill and how can we move a subject, which is often traditionally taught through didactic lecture, into more of a hands-on apprenticeship-type environment.

(04.06)

And so really the wonderful thing about the SynDaver is that at least it's giving us an opportunity to begin to bridge that gap, yeah?

Dr. Brad Case (04.14)

I do believe that if you understand the tissue properties and the pathophysiology of the disease, and you have basic surgical skills - and common sense - you can apply those basic skills that you learn from your courses, and maybe a clinical spay, to other procedures.

Dr. Galina Hayes (04.33)

In my opinion, surgery is a very... It's heavy on hand skills. Yeah? And you can talk about it in a PowerPoint all you want, but nothing really replaces having someone stood across from you adjusting how you're holding instruments, adjusting your body position, adjusting your tissue handling. And it's those skills that translate into patient benefit and patient safety.

(04.56)

Esoteric knowledge of adrenal gland vasculature is not helpful if you can't make your way to the adrenal gland in an atraumatic manner.

Dr. David Danielson (05.04)

So here at SynDaver, what we are looking for is to fulfil curriculum need. The University of Florida specifically saw the need for an alternative to cadaver surgery. It was not working. And live surgery, too, was something that they did not want to persist with. They had specific curriculum tasks, surgeries that they wanted the students to be able to do that we needed to fulfil in the model.

Dr. Brad Case (05.31)

We set up an interview meeting with them, we drove down to Tampa one day, we pitched an idea to them about using their technologies that they had already, you know, developed and had been marketing and applying on the human side, for dogs.

(05.46)

From a practical perspective, the vascular anatomy. So how big is the vessel? Where is the vessel? Is it there or not? Does it connect to the right places? With the texture of the organs, are they… are they stiff, too stiff? Are they too friable or too soft?

(06.05)

Because all the different organs - the liver, for example, compared to the spleen, the liver is very soft. The spleen is a little bit more stiff. And at first they were kind of the same. And now, we've spent a lot of time on them, and they're beautiful.

(06.17)

The liver is very, very close to the texture, the feel, the compressive abilities, qualities, it's vascularised - we have a little bit vascularised - of a dog liver. We've got quite an impressive high fidelity canine now.

Dr. Jose Carvajal (06.37)

The first time I saw these SynDavers, the first thing you want to do is take 'em, touch 'em, feel 'em. What does it smell like? Why...? Is it pulsing? Is there blood running through these organs? And those are all things that that are exciting, and just the realm of possibilities seems endless.

(06.59)

The advanced surgery course taught us a lot of abdominal procedures. Anything from a splenectomy to liver biopsies, OK, to an enterotomy; to a resection and anastomosis of the small intestines; cystotomy, which is an opening of the urinary bladder.

(07.16)

All these are really common procedures that every, you know, small animal veterinarian can do and should do at a small animal practice. And those are all procedures that we were able to do and the SynDaver demonstrated them well. It gives you a sense of belonging to something that's going to revolutionise the way your profession is taught.

Dr. David Danielson (07.37)

So the first thing that I'm proud of, and like, is the fact that it does have a very realistic airway. The tongue, as well as the internal aspects of the glottis and all, allows intubation. Also the face, I tried to give it kind of kind eyes, and you feel a bit of empathy for the canine as you use it.

(07.57)

Second, we do have the ability to put IV in both front legs, in the cephalic vein. To that, we can also draw blood from those areas. We have... The jugular vein is modifiable, so it allows central line catheterisation, but you can draw blood from both sides. Also there's a pulse.

(08.14)

You can create anaesthetic scenarios where the learning experience can be beyond just what's being done within the dog.

(08.23)

In the real world, you've got to worry about their breathing, you’ve got to worry about their blood pressure, their heart rate. And the dog, because of our ability to have it kind of change through a tablet, we can alter heart rate, we can put them in ventricular tachycardia, we can modulate them.

(08.41)

Going down to the surgical consideration, we do have a surgical... what we call an abdominal skin plate that has in it, a *linea alba* that is a central area that allows surgery. The muscle, skin, fat and fascial layers are all present. So that as a surgeon, if you cut appropriately, it kind of guides you.

(09.02)

And that's really what we were attempting to achieve here, is that as the surgeon goes into the abdomen, you want to have it guide you as to what needs to be done. Specifically, there are pathologies that we have developed into the dog, so that as a good surgeon, you would do a thorough exploration of the abdomen, and be able to discern what you're supposed to do. And this is kind of part of the training.

(09.25)

Looking into the chest cavity, there is a heart, as well as you can see both lungs and the bifurcation of the trachea. Since this can be intubated and hooked to a respirator, the lungs will expand and you can, of course, adjust that to enhance the scenario.

(09.40)

So we've designed this so that you have repeatability. The organs that are interfaced are replaceable. So specifically this right medial liver lobe, which is the first organ, it is vascularised, so that it will bleed. It allows practicing biopsy on it.

(09.58)

They basically can do several procedures, both punch biopsy, they can actually do a ligation [loop] biopsy on this, and you could do a partial lobectomy where you could remove that as well.

Dr. Chris Sakezles (10.08)

Conceptually what we do is very simple. You know, we start out with a live tissue study. So we'll actually get a sample of a tissue, we'll run it through a battery of tests that can be mechanical, physical, they can be things like puncture resistance, co-efficient of friction, abrasion resistance, tensile modulus - you know, stretching, pushing, pulling, and measuring the kind of loads you get in response.

(10.34)

Trying to figure out whether a material is more like a piece of spaghetti that's wet, or a stick. You know, the range of things that happen in the body: bone *versus* mucus *versus* muscle.

(10.45)

Then using a knowledge of material science, you can come up with candidate materials to try to mimic all of those things. And you might have 12 different properties that you're trying to mimic. And through a process of experimentation and designed experiments, you can come up with, you know, a material that would be considered a validated mimic for skeletal muscle, for example.

(11.06)

So when you take that tissue mimic, when you stretch it, when you push it, when you pull it, when you puncture it, it will perform reasonably like the actual live tissue that you're trying to mimic. And you know, once you've done that a hundred times, you've got materials that you can build an entire body with.

(11.25)

Everything, even something as simple as muscle is built up kind of like an onion skin. There's various materials inside, all of which are salts, fibres and water, but they vary depending on whether you're trying to mimic a tendon or ligament, or the lubricious surface of the muscle *versus* the more rigid core.

(11.45)

Other parts like livers and spleens and all those sorts of things, they, they might look like a blob on the outside, but on the inside, you've got duct work and you've got vasculature and things pumping through them and all that sort of stuff, so.

Dr. Galina Hayes (11.57)

Certainly I think one of the greatest strengths of SynDaver use is in its ability to provide a very high fidelity environment for the practice of abdominal surgery in dogs. For me, the intestine in the SynDaver is the closest to live animal dog intestine that I've been able to find.

(12.21)

It has very similar layering, it holds suture in a very similar manner. It handles the same. You can perform the same procedures in it. You're working down within a cavity. It holds staples in the same way that live dog intestine would. It certainly much improves the frozen-dog-defrosted experience.

(12.42)

We've really tried to focus on two target audiences, if you like. The general practitioners and ER doctors. The first would be a small animal practitioner in a busy, small animal practice environment who performs surgery on a fairly regular basis.

(12.58)

Probably the highest... highest risk procedures that surgeons in that setting perform are intestinal procedures. And there's an intentional emphasis on intestinal procedures for those reasons.

(13.13)

So the students are assigned in pairs to a cadaver unit and they each alternate performing different components of the procedure. They gown and glove, they drape in just as they would for a live animal. They have the same instrument set up and suction and lighting and table that they would have for a live patient.

(13.33)

And then our focus during the lab is to teach them gentle tissue handling, efficiency in their use of instruments, how to maintain a flow of productivity through the procedure and not get bogged down in unnecessary snarls. And safety: how to maintain a sterile field, how to manipulate tissue so they can maintain good visualisation.

(13.57)

And it's those core skills which they can then take on and apply to pretty much any other procedure that they try and do in the future, but which are impossible to teach in a didactic setting.

Dr. David Danielson (14.09)

This leads us to the bladder. And, of course, the bladder specifically has a few pathologies itself. There are, in this case, three stones that are palpable within it. This, again, guides the surgeon to perceive there to be a problem.

(14.24)

There's stones, though he doesn't know how many, so he must open the bladder, remove the stones, but thoroughly pass a catheter, clearing it, and then passing it again.

(14.33)

We will occasionally hide stones, and it is a way of testing whether they're thorough in their pursuits, and whether they take the dog seriously.

*Cystotomy lab*

Dr. Daniel Lopez (14.43)

You can either create, and flip your blade upside down, and just like the *linea*, do the reverse stab incision up, and then extend with a pair of scissors; or you can paint down with the blade until you're in the lumen and then extend with scissors. But I think either of those are fair.

Student 1 (14.58)

Ready.

Student 2 (15.09)

All right. Stones.

Dr. Daniel Lopez (15.12)

When you guys are suturing the bladder, please ensure, again, you go serosa to mucosa, mucosa to serosa, to ensure that you engage the submucosa.

(15.23)

Use your needle here to grab the loop, pull up, right? That's going to tension the previous sutures that you placed, and then pull it down. And as you pull it down, you're going to be able to put it in the position that you want the suture to lay.

(15.37)

And then once you're there, try not to move the knot, and then it's another additional five throws here, so three total square knots.

(15.47)

And I like the way you're flattening your hands. Rock your hand and your needle driver in your hand as you go. And so as you rock it, it's going to tighten each side now.

(15.57)

Looking at this, right? The only area that I would say, maybe you're a little wide on that bite, would be right here, right?

Student 2 (16.02)

Mm hmm

Dr. Daniel Lopez (16.03)

And so you'll always be able to push a haemostat through, but we can kind of gauge the degree of apposition. And it's pretty tough to get through. If you were nervous about that, and you wanted to sleep better tonight, a simple interrupted right there would be fine.

Dr. David Danielson (16.15)

Going further in, we're going to go ahead, and in this case, if the abdominal plate was opened, we would exteriorise the intestine. And again, as a good surgeon, you are thorough in your exploration, and will get the feel of the intestine and determine that there are certain irregularities here that you don't want to miss.

(16.37)

So as you go further in, ah, lo and behold, here's a foreign object. So it feels... kind of like a dice. How would I deal with this particular thing? Well, you would do an enterotomy. So at this point, you would cut, remove that foreign material, sew it up.

(16.53)

But there's another issue here too. There's a pathology, an area of irregularity, perhaps damage that was done by the dice. So this would guide us to consider this area an area where I would do an anastomosis.

*Enterotomy, resection and anastomosis lab*

Dr. Daniel Lopez (17.07)

What is going to be the preservation of your blood supply? And this is the hardest portion to figure out. I think with the resection and anastomosis, twofold, is, where to cut and what blood supply to save. And so again, if we're pretending that we need to remove all the sutures of the enterotomy, what arcades need to go and what arcades need to stay? We have great blood supply from this jejunal arcade -

Student 3 (17.28)

OK

Dr. Daniel Lopez (17.29)

...to supply this from this end.

Student 3 (17.30)

OK

Dr. Daniel Lopez (17.31)

So then in theory, if you want to save this, right, where would you place the ligatures?

Dr. Daniel Lopez (17.43)

We're going to want to make our cut away from the mesenteric surface at an angle, right? We don't want to make it this way, because then the tip of the blood supply is going to be poor here. So the way that you do have your Carmalts [forceps] placed is appropriate.

Student 2 (17.54)

Right

Student 1 (17.55)

Right

Student 2 (17.56)

I believe in you.

Dr. Daniel Lopez (18.02)

You want to actually pretend like you're placing a suture -

Student 1 (18.04)

Right

Dr. Daniel Lopez (18.05)

...almost at the base of the intestine and ligating and ligating, so that it's not bleeding. And actually it's like a very prominent artery that'll spurt at you. And so they can be a pain.

(18.14)

So I find trying to create an environment for success before you cut the intestine is important, because once you cut the intestine, you're going to… you're like… you're trying to get it back together as soon as you can. So plan, plan, plan, plan, have everything set, then cut the intestine.

Dr. Brad Case (18.30)

The SynDaver's great, it's got these big, long segments of bowel. And you can do an enterotomy, where you incise it and suture it back together; and a resection and anastomosis, where you actually cut out part of it and then suture it back together - and still have a ton of bowel left.

(18.44)

So when we're done with those surgery labs for the advanced students, we take all that viscera out, and we cut it into little pieces. And then we take that tissue and we bring it to the basic surgery course.

(18.56)

And then we put high definition videos there, and we show them, this is how you do a gastrotomy. Here's your segment of stomach tissue. Here's the layers. Here's how you do the suture pattern for those layers. So they have actually done it in a modular sort of fashion as a sophomore before they get to that SynDaver experience with the full dog.

Dr. Galina Hayes (19.14)

So I think surgery is very much an iterative, cumulative acquisition of skills. And when you begin surgery, you don't know how to hold a pair of needle drivers, and you don't know how to tie a knot. I mean, it's very appropriate that you learn to do that on a silicone pad.

(19.31)

And then the next challenge after that becomes how to adjust that suture tension appropriately to the tissue that it's being placed in, and then a silicone pad no longer works, and you need something that simulates tissue.

(19.42)

And then the next challenge after that becomes, how do I do those things while working down and inside with another piece of bowel trying to flop on top of a piece of bowel I'm working on - and then to learn that skill set, you need an actual full dog.

(19.56)

And then the final part of it becomes, how do I learn to do that with a patient that's breathing and moving and bleeding, where I feel the pressure of emotional responsibility to the patient and the owner to perform optimally, and for that, you then need a live patient.

(20.14)

And so you go through this process of silicone pad to isolated piece of bowel to simulator unit to patient. And you would never think that your entire surgical training could be accomplished on a silicone pad, but you would never begin with the live patient.

(20.30)

For any skill set, there is a learning curve that exists. When you're low on that learning curve, you will have an error rate, and what is important is that that error rate not be transmitted to the patient. Yeah?

(20.43)

Learning in an environment... Just in the same way that airline pilots learn in simulators, surgeons need that same opportunity. Pretty much anyone can become a surgeon eventually, it's not difficult, but you... you have to have the environment to learn, and you have to have the environment in which you can make errors, and you have to retain your love for that skill set through that process.

Dr. David Danielson (21.07)

Going further back, you can appreciate the stomach and the omentum, which is draping all of the intestine. This is a female dog, it's also designed as a spay trainer. We do have the reproductive tract represented. It also has the suspensory ligaments, the broad ligament. It has the horns ovary.

(21.32)

You would have to approach the abdomen, go in and break down that suspensory ligament, ligate the ovarian vasculature, and then come down, break it down and remove this as you would a common spay.

(21.46)

One of the concerns we have as surgeons who might do an ovario-hysterectomy is a condition called a dropped pedicle. So in the process of doing this procedure, if you did not ligate properly, or got distracted, or you sneezed, or some problem arose, you might happen to not close the vessels that feed the ovary properly.

(22.07)

Upon losing that, or dropping it into the abdomen, it'll bleed freely. And that is considered an emergency.

Dr. Galina Hayes (22.12)

I think it's important to recognise that all surgeons, no matter how experienced and how proficient, will run into situations where either they've made an error, or just the nature of the procedure that they're working on, means that some untoward event begins to occur.

(22.31)

Typically that would be active haemorrhage, it might be loss of control of a ligature, it might be an insecure knot, it might be inadvertently traumatising crucial tissue. But those events are going to occur at some point, no matter who you are and how good you are.

(22.50)

And it's important, in my opinion, that students experience that emotion for the first time in a setting where there is not a live patient at risk, and where there is someone available to mentor them through how specifically to address that issue.

(23.09)

And so that's a great opportunity to give them their first introduction to that emotion and how to handle it.

(23.15)

And some students just, you know... People are different individuals, some students handle it very well, some students need to do that multiple times before they can really feel comfortable - maybe comfortable is the wrong word - but feel able to perform competently under stress.

Dr. David Danielson (23.29)

My goal in these cases is to have them fail. It's fine and good if everything goes great and you're doing things well, but in the real world that doesn't happen, you do have issues, things do occur, you see things that you didn't expect, and complications can arise.

(23.43)

I want to put those things that you fear, those things that you would not want to happen on a real live dog, have them occur on the model.

(23.52)

So that it's not simply perfecting the perfect surgery, but dealing with a complicated one, dealing with something that doesn't go well, and being able to work through that anxiety. My hope would be that in the real world, when these veterinarians come out and actually have a complication or a difficulty, they will be able to think back and say, this is easy, I had it much worse when I was dealing with the model.

*Dropped pedicle lab*

Dr. Daniel Lopez (24.15)

We're going to set up a clinical scenario where one of their pedicles, secondary to a spay that they've been doing, is now bleeding. The patient is starting to decompensate, their anaesthesiologist is panicking. And we’ll set up a high-pressure situation for them to try and figure out where the bleeding is and to then stop that bleeding.

(24.38)

And so we can set the heart rate and the strength of the beat as well. And this should turn it on, which will then pump water throughout, which is our blood.

(24.48)

Because your blood... your heart rate has now come up to 160 beats per minute.

Student 3 (24.54)

Oh no! There must be something bleeding. OK, I'm going to check here... Oh, there it is!

Dr. Daniel Lopez (25.04)

And your patient's heart rate is 180 beats per minute.

Student 3 (25.06)

And this stupid haemostat is not working!

Dr. Daniel Lopez (25.10)

We're up to 200 beats per minute.

Student 3 (25.17)

Right, I’ve found it

Dr. Daniel Lopez (25.18)

Or are you just going to go into cardiopulmonary arrest?

Student 2 (25.20)

Right, I’ve got it

Student 3 (25.30)

OK, bleeding is under control.

Dr. Daniel Lopez (25.32)

And our heart rate is coming back down slowly here.

(25.37)

So once you're done, cut that, and release the haemostat, and see if it's bleeding.

Student 3 (25.45)

Not bleeding! We saved him. We saved him!

Dr. Daniel Lopez (25.51)

And so I would say that was really good. You guys identified the major bleeding pedicle. The only thing that I would say, instead of going directly in with a haemostat, right, start with the Balfours [retractors], right? Get in, improve your visualisation, right? So you can truly see what's going on.

Christine Leung (26.05)

We were looking for the source of bleeding, and we found it. There was a dropped pedicle on the left side. And we isolated the bleeding, and got a chance to tie it off, and check everything else as well, once over. And yeah, the dog is alive - or never was alive - but is fine.

[Interviewer] (26.26)

How did you feel as the crisis developed?

Christine Leung (26.29)

I mean, yeah, I do feel like the machine really hyped it up, made me think something was really dying. But yeah, it was well controlled really quickly. And we were able to visualise everything very quickly. So that was good.

Dr. Galina Hayes (26.41)

I think really the… SynDaver lab accomplishes multiple facets, or multiple goals. One is to try and remove students' natural fear of surgery. It's very hard to behave with good competency and calmness when you feel stressed or afraid.

(27.03)

The second is to encourage an enthusiasm for the procedures and for surgery in general, and encourage them in the idea that your surgical training is an iterative process - you acquire a skill, you practise it, you discover that you need another skill, you go learn it, you practise that, you constantly improve and that's a lifelong career commitment.

(27.27)

And the third is to give them a basic skill set which will translate into any surgical procedure that they undertake.

Dr. David Danielson (27.35)

So we have created a series of pathologies right here, and I'm going to go ahead and kind of show you each one. There is a condition where the reproductive tract will get infected in an intact, older female dog, called pyometra.

(27.48)

It is similar to a spay when you have to deal with that, but the friability of the tissue, the fact that it is an infection and the consideration that it's a lot more vascular, makes it more of a challenge.

(27.59)

Another thing that you really don't get to see that often, but when you do, it's quite a serious consideration, is a diaphragmatic hernia. The diaphragm, of course, is the layer of muscle that separates the thoracic cavity and the lungs from the abdomen.

(28.13)

And in that regard, if there is a traumatic event - hit by car - there'll be a rent in that muscular layer that allows GI to get into the thoracic space.

(28.23)

This is one of our newer pathologies, I've really always wanted to create. A GDV is gastric dilatation volvulus. What this means is that an animal - a dog specifically - will gulp air, usually by eating quickly.

(28.36)

And that stomach becomes distended with that air, and then it goes outside and plays, and bounces, causing that inflated stomach to twist. So it's very important that they get to the hospital very quickly, that that stomach is deflated, and that twist is corrected.

(28.50)

Again, this is the type of pathology that I want every student to become comfortable with, to experience, so that when they do see it in the real world - and they will - they already know what to do, they already know how to save that dog. And even those who are familiar with and have seen this before, this could allow you to hone your craft.

(29.08)

So the same was done for the spleen. As we've shown, the popular spleen now is the one with the cancerous pathology that would allow bleeding to occur at that time. And again, the vasculature here allows either this four-point ligation, or you could go along the hilus here, and ligate these vessels, and remove this spleen before the animal bleeds to death.

(29.32)

When developing this, we actually had it validated by several surgeons. One of my mentors - I won't mention his name - was doing the splenectomy.

(29.44)

And because it was a model, and you know, your initial consideration is not to take it seriously, he went ahead and simply did a single ligation. Just one clip, tied it, cut the spleen, removed it. Of course, it fountained, literally blew blood all over his chest.

(30.02)

He said, “It taught me a lesson”. I said, “Well, when you taught me, I do three ligatures and I tie it, and I do a transfixion.” You have to do it right. If you don't truly ligate something properly, it will punish you. Of course, if it's your live patient, it's going to punish them.

Dr. Galina Hayes (30.18)

We have a conference coming up where we're allowing general practitioners the opportunity to come and perform some fairly basic abdominal procedures, so things that they're probably doing every day in practice, under the supervision of boarded surgeons.

(30.38)

And the goal of the lab really is not to teach them a new procedure, but to adjust their current technique in a way to improve their efficiency, their tissue handling skills, their instrument flow, teach them all the thousand and one tricks of the surgical procedure which make it a 20 minute, very smooth procedure, rather than a 50 minute 'Oh my God, I can't believe I just had to do that' procedure.

Dr. David Danielson (31.03)

So this actually is our military trauma dog. It's designed for first responders and military units to simulate, basically, gunshot wounds, or if you had an improvised explosive device, shrapnel and such. And it's designed to die, you have to save it.

(31.20)

There are certain skill sets that we want those individuals to do that are not typically done in the regular practice.

(31.28)

So with injuries within the lung, you can have contusions, you have fluid accumulation within the lung. The fact that we have these skin plates, you would then get to the proper space, you would make your incision, and then track a haemostat in with a tube and pop into the lung space.

(31.44)

And if you look at the abdomen, it's pooling with blood, there's actually bleeding injuries. Here's the spleen. It has, basically, shrapnel wounds and it's haemorrhaging accordingly. So this spleen would have to be removed to save this dog's life.

(32.03)

Pretty, uh... pretty severe. As you can see, poor child is bleeding to death before us.

Dr. Chris Sakezles (32.09)

Well, the most difficult thing about getting something like the synthetic canine into practice is the cost. We have a number of ways we can help universities and different places acquire them. It's an investment, it's definitely an investment.

(32.24)

You know, the argument that we make, and the argument that's 100% true, is that you get superior training. You know, if you really want to be in the business of graduating students that are going to be able to practise and perform surgery, you're doing them a disservice if you don't invest in this sort of platform.

(32.43)

Ethical considerations aside, do the right thing and just save yourself so much time and money. It's a good idea. If you've got... if you've got a good model, it doesn't make sense to not use it.

Dr. David Danielson (32.54)

People have to realise, there really isn't an alternative to fulfil what I'm looking to fulfil, which is a superior experience, repeatability, controlled pathology, you know, scenario-based.

Dr. Galina Hayes (33.10)

For me, performing that kind of surgical training on a live animal which is being used solely for the purposes of training and is then euthanised, is unacceptable for a large number of reasons - not the least of which that I believe it inculcates in the beginning surgeon, the idea that the patient is disposable. And I would not be ever willing to participate in a lab like that.

Dr. Brad Case (33.39)

The only use of live animals in the training of surgery at the University of Florida is in our small animal hospital where we have board certified surgeons who are doing clinical surgeries with our professional veterinary students, either assisting or watching.

(33.55)

I am not a believer in terminal surgery. They don't do it in human surgical training, and I don't - it's my opinion - that it's not something that we need to do in veterinary. And I've always felt that way.

Dr. David Danielson (34.06)

Ethical training will allow people to go into this profession and have a clear conscience. But I think, too, they won't be any less trained. You can learn good medicine and be ethical at the same time. And I believe in the long run, that will translate to being a better, more empathic doctor too, because you don't carry that burden.

(34.30)

When I graduated, I did have to experience a terminal surgery. In hindsight, I don't feel that that really taught me anything that helped me in the future. In fact, I still carry that scar.

(34.44)

It all circles back to that core necessity, on several fronts. One, to preserve our own emotional and ethical… kind of… compass; as well as to allow us to be better clinicians, to give our clients better service, better medicine.

(35.04)

I love caring for animals, I see myself more as a paediatrician than a veterinarian. I see veterinary medicine and the practice of veterinary medicine, more about preserving the bond. I feel a great weight of responsibility that the connection between that client and that patient, I mean, that is... that's just pure love.

(35.27)

And our ability as clinicians to preserve that, well beyond where it used to be, because we live longer now, and preserving quality, is really why I think the profession has expanded so much. People are appreciating this unconditional love that these companions give; and by that, we are able to, you know, be part of that connection.

(35.53)

So it is a bond. Almost like the old family physician, you know. It is really... It's a joy for me, actually.

END (36.37)