[MUSIC PLAYING]

LEE CULP: All right, so this is going to be fun because everybody is going to trickle in. So that's good. I'll try not to get distracted by that. That's OK. People are out there talking. We like that. All right, so I guess I'll just get started. Make sure that's going on.

So this is the 19th Annual conference presented by Roswell. I just wanted to throw a few tidbits out there. This is part of the Pelvis Symposium that we're putting on. And so I just wanted to put out there that there's going to-- 19 presenters and topics. That's pretty good for a small meeting this size. So I think there's like 220 some odd people here as well. So that's nice.

I have no disclosures really to any of this. Everything is just the results of studies, protocols, opinions. I've received, obviously, no honorarium. Anything you see in this is going to be Eclipse version 15.

But I'll put a shameless plug out there. I am the junior co-chair of the Annual Conference Committee for AMD. So this coming 2020 is going to be in Baltimore. So if anybody wants to put in any submissions for it, please do.

It's open right now. And then the year after, I'll be the senior co-chair, which is in New Orleans. So that'll be kind of fun.

So a little bit about me. So I have a master's degree, as well as my RTT as well. I'm a dosimetrist at Roswell. I've been there since January. I was previously at the Ohio State University. I worked and did mostly breast cancer.

So a lot of people say I'm the breast expert. I don't know if that's true. But I did study under Dr. White, who she wrote all the protocols on breast cancer and breast cancer treatments. So my go-to is prone breast treatment. But I took a dabble in doing this pelvis presentation.

So my master's is from the University of Wisconsin La Crosse. My master's thesis was actually on male breast cancer. And I have a business and communications bachelor's from the University of Buffalo.

These are my pride and joy, Luna and Stella. The one can actually float by herself. The other one struggles a little bit. But that's all right. They're my babies, and I love them.

So a little bit about radiotherapy at Roswell. We treat all sites. At OSU, it was a little different. We did breasts at one site and then everything else went to another. There's four vaults and a Brachy suite-- one CT, roughly around 17 therapists, 8 dosimetrists, and 11 physicists.

It was founded in 1898, the first institution that focused on cancer research. And the mission was patient care, cancer prevention, and education. And it's just recently announced that in the past month or so that it's the 14th, ranked 14th, in the country for cancer hospitals by US News.

This is your talk right now-- Dosimetrists Guide to Pelvis Irradiation. We'll discuss sites, preferred treatment, dosages, tips and tricks. Will this be relevant to the therapist? So yes, it will be.

It was hard to do this because I'm a dosimetrist, right, but I tried to do-- so maybe about 70% to 80% of the people in here are therapists. And the next 20 to 30 are dosimetrists. So I tried to make this presentation about relevant percentage-wise. So I hope you like it.

So I'll talk a little bit about gynecological cancers-- ovaries-- ovarian, I should've said-- uterus, cervix, vagina, and vulva. So those are gynecological. That makes sense. It's the fourth most common malignant tumor in the US diagnosed for women, about 20% of all cancers.

And about a million cases are diagnosed worldwide with the GYN cancers. Radiation therapy is commonly used as the definitive treatment for the early stages, sometimes for palliative, almost palliative, it's helpful as well. And locally advanced stages with surgery and/or chemo.

So some of the approaches. You can use extended field to involve the paraortic lymph nodes. Inguinal, lower vaginal involvement. There's brachy as well. And VMAT. Sometimes we use VMAT a lot of times with SIB, so your Simultaneous Integrated Boost. Or if there's lymph node involvement.

Each center-- you know, some centers prefer to do VMAT for everything. Some centers do four field. And VMAT just really, honestly, is center-specific. Both centers I've been at have done it their own ways.

So we'll go on to this one, I think. Click happy. Actually-- oh, that's right. There we go.

So for cervical cancer, radiation is used for nearly all your stages. Your cure rate's about 80%. So that's a pretty good cure rate. Radiation is used alone for early stages. And then if the tumor is going to extend, some of your later stages, greater than 4 cm, that's when you're going to do surgery with therapy radiation.

For your uterine cancers, you're going to receive a surgery up front. That's going to be your total-- bear with me-- total abdominal hysterectomy and bilateral salpingo-oophorectomy. Sorry about that. And your radiation is going to be delivered postop.

You're going to either get the pelvic radiation or brachytherapy. And it helps with the risk of local recurrence, and it helps as well with chemo and surgery. That's your cure rate.

So your ovarian cancer-- it's no longer used alone, used with following surgery. It's used conjunctively with chemo or surgery. So we don't just use it by itself. So the studies have found that ovarian needs obviously surgery and/or chemo.

The standard practice for ovarian cancer is your chemo, but radiation is actually important for your palliative treatments. Right, yeah, and I think ovarian is-- when it's found I think it's in one of its late stages because it's so hard to identify. So that's why you're going to need your surgery upfront.

So your vulvar cancer is almost the same way. It's up-front surgery. It's then followed by adjuvant therapy or chemo, and the therapy, the radiation significantly reduces that risk of recurrence, especially in the inguinal nodes. And then, It's also the treatment of choice after your surgery.

So your therapy, radiation therapy techniques are going to be your pelvic inguinal radiation. That's for something that's unresectable. It's followed, then, by a boost, usually with a midline block, and that's to protect those organs at risk in there. And you're going to go for a high dose for your control of the primary tumor. And you don't usually use Brachy in cases like this. There's no real benefit for it, unfortunately.

So again, radiation is your treatment of choice for vaginal cancers now. It has excellent outcomes, and it's locally advanced, receiving radiation therapy and Brachy. That's usually what you're going to treat vaginal cancers with. And actually, there's a low number of vaginal cases diagnosed early. That's good.

So external beam-- it's used to radiate multiple targets within the pelvis. So that's going to be your uterus, your cervix, your upper vaginal, the paracervical/parametrial tissues, and your pelvic lymph nodes. So that makes sense-- just all within the GYN area of a female pelvis. So that was covering that.

And so then, your external beam therapy, you're going to-- you know, sometimes you'll do AP/PA fields, or your four-field box, which is your AP/PA and your lateral fields, and that allows for more normal tissue sparing-- so for your small bowel, or your posterior rectum.

So if you think about if you're just going chewing through your anterior and your posterior, you're going to be blasting all of your organs in the front and the back. So if we add those four fields on the lateral field, it's going to cool it down because we're not always blasting through that. And sometimes we'll just do a three-field, depending on what it is.

And then you also could have a VMAT or IMRT, depending. If it's one-sided, we might do IMRT. If it's VMAT-- if it's central or smaller located, we're going to do VMAT most of the time. So for your external beam, superior borders, you're going to see your L4 to L5. That Includes your common iliac lymph nodes and your inferior borders, your inferior obturator foramen.

And then, obviously, your lateral borders, you're going to see, is 1 to 1 and 1/2 beyond the pelvic brim. I have some pictures of this so you can see. And that's your traditional field that you would see. We still treat with these as well, but your pelvic therapy fields have traditionally been designed based on the bony anatomy. So that's really what drives your fields, how you're going to shape them and everything, is by the bony anatomy.

So on your anterior border, it's lateral to the pubic symphysis for the external iliac nodes, and then your posterior border is your S2 to S3 interspace in your back-- back here, I guess. And then you're going to use customized blocking, so the MLCs, to decrease dose to the surrounding tissues, right? So that makes sense.

So here's a picture of what we would use. So you're seeing how the MLCs are all placed around it. And that's typically what you're going to see, and the reasons why, as I just went over. And then that's your lateral field.

So for your positioning, most centers are going to treat these fields supine. Some will use prone with a bellyboard. That's to help reduce the volume of small bowel irradiated because your small bowel, if you treated prone, is going to fall away from the treatment field. And that's when we're going to only use three fields. And usually-- sometimes we'll treat supine with three fields. That just really depends. Sometimes that's what the physician wants, and we'll see.

And then, some centers prefer to treat with a full bladder to displace the small bowel, but like everyone else has said, you want to be consistent with the bladder and the rectal filling throughout the entire treatment. That's really key for all of that, is if I'm going to plan it with a full bladder and it's going to be treated with an empty bladder, then that's going to cause some problems, and vice versa for the rectum as well.

So we do everything-- it's kind of like volume-based planning now, right? We used to not, or we used to do 2D planning, and now we do volume-based planning as we progress through everything. So we're going to use moderate- to high-energy photon beams, usually, for anything like this.

So you're going to use anything above 10X. A lot of times, machines don't have 10X. They might have just 15 or 23, and those are fine to use as well. And then sometimes, if the patient's really small, I've done it before where I've used just 6X and I had no problem using it. Still, the 10X, anything above a 10X is going to cool that down. The 6X will make it a little bit hotter. But it really is patient-dependent. Most of the time, we're going to use anything above 10.

And then your wedges, people often ask, why are you having a wedge here, or whatnot. And those are just used to decrease your hot spots on your lateral fields. We don't usually use them on your AP or your PA.

So these are your doses. Your doses range from, obviously, you see, 3960 to 5040. That's 180 to 200 per fraction. And your higher doses in your patients are undergoing external beam alone. If you're going to see a lower dose in your external-- a lower dose, that means-- a lower dose for external beam, that means they're going to get Brachy along with that.

And so sometimes, like I mentioned before, a midline block is used, and that allows for a higher total dose and utilizing the Brachy. And that's usually with your cervical patients, and it's typically 10 to 12 Gray, or 1,000 to 1,200 centiGray, and it's five to six fractions, right?

So here's a picture, old school picture of a midline block. I thought it'd be cool to throw that in there. I don't know. Thanks for laughing.

[LAUGHTER]

AUDIENCE: [INAUDIBLE]

SPEAKER: It's not. So we can go back. I mean, yeah, it's an old school picture. Like I said, I thought it'd be interesting and different to throw it in there, because I could tell you a whole bunch of VMAT stuff, but I think a lot of people will see that and know that.

So we're going to use-- sometimes, like I said before, we'll see an increase in IMRT for our GYN cancers or VMAT. What I had learned, that a lot of places like to just default to VMAT, but you don't always have the default to VMAT, especially if it's one-sided or oddly shaped on one side. You can do IMRT just fine, and you can avoid the whole other side. So I've done that a lot of times.

But sometimes, you're not going to see anything GYN area that's not in the center-- but you might. There's a possibility. I've done it before. And the reasons we're going to use IMRT or VMAT, and that's to reduce the pelvic bone marrow, and also, we can reduce the dose to the other organs at risk as well, and we can give a higher dose rate-- or a higher dose-- to the tumor while avoiding all the other structures.

And that's the real reason why we've progressed to IMRT and VMAT, if anybody didn't know that. But it's also good for patients that are getting chemo, so-- [PAUSE] Didn't realize how thirsty I was.

So yeah, like I said, we're going to utilize IMRT to deliver higher doses. When I say IMRT, I'm also referring to VMAT as well. And then we're going to-- techniques are usually above 6,000, so we're giving-- like I said before, you saw, I think it was, like, 3960 to 5040 with, like, 3D doses.

Now, if we're going to VMAT or IMRT, we're going to be able to increase that dose. Because with the other ones, we're still blasting through all of our organs, and it's still killing them, but this way, with IMRT or VMAT, we can avoid those structures, so we can go to the higher dose.

And then this, we can also use the SIB technique, simultaneous integrated boost, with IMRT or VMAT. Or you can do it with 3D. I've done it before-- I always say I've done it before, sorry. But you can do it. It's just a calculation that you have to figure out. But it's easier to do with IMRT and VMAT.

It's also, if you have all your weighting equal to 1, you just have to figure out your percentage, but-- So yeah, you know what your SIB means-- it's you're giving a boost at the same time as your initial plan. So your para-aortic, you're going to get around 4,500 and then you're going to boost the additional 6,000, but it's all delivered at the same time-- so in case anyone didn't know that.

And then, so we're going to use an SIB, usually, when you've got involved lymph nodes. That makes sense. And so you're going to get your conventional fractions through about 4,500 for 180 per day and your lymph nodes then can see that higher dose of about 6,000, and it's about-- you're going to get 240 per day.

And your targets that we have for IMRT or VMAT are going to be based on ICRU 50 guidelines. That's, like, a protocol. So your GTV is, obviously, your gross tumor volume. Your CTV is your clinical target volume. Your PTV, obviously, is going to be your CTV plus 1 or 2 cm, depending on the physician.

And that PTV, obviously, is for patient setup and uncertainty for the organ motion. I think we all know that. And then your CTV nodes-- your common, external, and internal, iliac and pre-sacral. And your CTV vagina is your vaginal cuff with the paravaginal and parametrial tissue. So that makes sense.

So these are your normal tissues, your organs at risk. Small bowel, bladder, rectum, sigmoid colon. Sometimes physicians will draw that in. Sometimes they won't-- depends on what they're going for. And your pelvic bones, or your femoral head, and those pelvic bones-- it's going to be where you're going to see most of your bone marrow and such. So that's what we're trying to avoid sometimes when we're treating with IMRT or VMAT.

So again, your VMAT plans are typically to 4,500 and 180 centiGray per day, and then your VMAT plus Brachy is going to a higher dose at 5040 or sometimes 60. Sometimes we'll treat frog leg. Hold on, why is this not showing up? There it is.

And that's going to be for your lower vaginal, pelvic-inguinal irradiation. It's going to be treated supine, like Patty showed us on Joe's slides. And then what that does is it minimizes the skin folds, so that's why. You're going to reduce the hotspots.

I think we all know that, though, but sometimes when we're treating like that, we're going to do a 10X. 6X is going to make that really hot in there. A 10X or above will help that immensely. And we just don't want to-- like I mentioned earlier, it's hard. There's a lot to go into this, but you don't want to repeat what everybody else said, so I'm trying not to.

So it doesn't apply to you-- I apologize. But your constraints on your small bowel-- we're usually looking at about a max of 4,500 centiGray. And your kidneys, if we're doing an extended beam, extended field, we're going to want to avoid the kidneys. And that's what we're looking for, is 33% of that to receive less than 1,000 centiGray.

Spinal cord max-- again, if we're going high up, we're going to look at 4,500 because you know, your spinal cord ends at about L2, L3, patient-dependent. So it might be in that view of where the kidneys are or where the para-aortic is because the kidneys are, what, from T11 to L2? So you might have some interlap, and that's why we're looking at that spinal cord.

Rectum, 50%, less than 50%-- Gray, 5,000 centiGray. And your bladder, just roughly around the same-- 50% less than 5,500 centiGray. So that's usually what we're looking for there. There's a few more constraints that we go on, but those are our key ones that we want to really abide by. Bless you.

Jump into prostate cancer. So I try to do some GYN, try to do some male. Eh, we'll try. So it's prostate cancer. It's the most commonly diagnosed malignant tumor in the US in men, obviously. We're seeing about 190,000 new cases yearly.

Number keeps creeping up, but that's because of the PSA, and that's that pre-treatment prostate specific antigen. It's a blood test that helps diagnosis of early stages of prostate cancer. And unfortunately, about 27,000 men die from annually because, like my dad, they refuse to get any kind of testing. And then, the PSA tests, obviously, improve their outcome because it can be detected early. But yeah, I think, like, the older generation, they just are not willing to get tested for that, and I don't really know why. We have a lot of discussions about that at dinner sometimes.

So we'll jump into the techniques for that. You're going to, obviously, do external beam photon. That's why I'm here talking about it. So usually, you're going to use a CT or MRI-- fuse those together when you have them. Usually it's done IMRT or VMAT. Or sometimes. you can use low dose Brachy or high dose rate Brachy.

We don't see too much of that, and I was told one time that Brachy for prostate patients is really how it can be sold. So our treatment is how it can be sold to the patient. So if you have a good surgeon who has really good bedside manner and a real good salesman, he's going to be the one that convinces the patient to get the Brachy. But if you have a good radiation therapist who has a good sales technique and a good bedside manner, he's going to be able to convince the patient to get the external proton beam. That's what I was told. I don't know. I don't have good sales, so--

So prostate cancer can be treated with a radical prostatectomy, right? It gives you a substantial risk of impotence, so a lot of patients don't like that. You get urinary incontinence and sexual dysfunction. Those are your side effects from it. But basically, they're just taking out the prostate.

Can also treat prostate with, obviously, radiation therapy. You're going to always treat the prostate-- that's obvious-- and then you're going to sometimes include the seminal vesicles or the pelvic lymph nodes. Depends on the staging of the disease, right? But that's with you've got high-risk nodal disease and worse clinical outcomes. So you know, I'd say like 30% of the patients we treat are just the prostate, and the rest of them are going to be the prostate plus the nodes, that's when you're going to see an SIV technique as well.

So again, your normal structures are really similar to your GYN cancers. So you've got your rectum, your bladder, femoral head, and your small and large bowel. You're obviously not going to worry about your spinal cord because we're not going up that high, and then your penile bulb, which you wouldn't see in a GYN-- so your normal structure that we're trying to avoid.

So traditionally, we did a four-field box. Now, with technology and stuff, we can use inverse planning IMRT, VMAT. It improves the normal tissue DVH, and you can obviously receive a higher dose with the IMRT as well.

So we're looking at fractionation that's higher than the GYN, and you're looking at 7020 to 80 centiGray. 80,000-- or 8,000, I should say. I'm sorry. When we're just going into fossa, that's just going to be the 6,800 centiGray, and the fossa is when we've had that removed, and that's 180 to 200 centiGray per day.

So that was just a little bit about prostate. That's about-- so now I'll just go into some tips and tricks, because I think that's what everybody wanted to see, if you're interested. So usually we're going to use a 6 or a 10X, if possible. Sometimes machines don't have anything above a 6X and we just have to do the best that we can, but anything above the 6X with, like, a 10X, or a 23, or a 15, will cool off that plan significantly. Bless you.

When you have, like, 6Xes, I don't know. Maybe 112 is-- your first optimization is what's going to give it to you. But a 10X should give you any something less than 110, at least initially, and then you can optimize further on that.

So we're going to want a full bladder or empty rectum, but again, everything should be similar for each treatment. We don't want to-- you don't want anything to be different, because if I'm going to plan something specifically, I want to treat it the same way that I planned it, which makes sense.

So my isocenter, I'm going to try to make that central to my PTV. I might combine all of my structures into one PTV total and put it in the middle of that. That's just a trick that I've learned, that if I want to include everything, I'm just-- I put it into one total. And that's one of my trick structures that I'm going to use.

And the reason why I want to put my isocenter at the center at the center if I can is because that's where your beam is the most intense. So it allows for you to focus on that area. And usually, the center of it is going to be your high-risk area. And that's honestly how I would plan a breast as well. I'm going to put my isocenter in the middle of the lumpectomy if I can do that as well, because if you're going to recur, that's where you're going to recur 98% of the time.

And so also, I'm going to look for it to minimize the travel of the x jaw because the x jaw can only travel 15 centimeters. Anything above that, it can't close. So that's why sometimes you might see three fields, or sometimes four fields-- because of the shape and the volume of the PTV.

So sometimes, also, to help decrease the rectal dose, we'll want to put the isocenter ANT to POST to the rectum and where the prostate meet. That might help with our rectal dose as well. My foot is sticking on that side.

So I like to put my collimator angle the slope of my rectum. So I'll rotate it around and I'll watch it and-- because you shouldn't always have it at zero. You should never really have it at zero, but you want to give it as somewhat of a tilt to it. And so if the rectum is coming in at-- so if, say, I bring my collimator down to about 90 and I see my rectum's like this, that's what I'm going to put my collimator angle at. But that's going to help me reduce my rectal dose as well, and that's going to be for a prostate or any GYN, honestly, because I'm really trying to protect that stuff.

That's what I talk about here. You're going to play back the arc rotation prior to the optimization because that's going to give you an idea of what you're looking at with your rectal and your bladder as well, and you're also going to want to ensure that your jaws aren't too tight on your PTV. That will cause the plan to be really hot. You want to give it somewhat of a margin and, if you can, turn on jaw tracking. That's helpful as well because it'll minimize the leakage through the MLCs.

So I'll go into some of my trick structures that I use. I guess this wasn't the best. I maybe should have done a different color. But you'll see, there's like a ring almost.

I call this my pPTV. It's like planning PTV. Anything that has a line before it means it's one of my trick structures. And this is just a millimeter expansion in all the directions except ANT to POST, and that helps me get coverage to my PTV volumes.

So I just chose a prostate in this really quick. But yeah, I wanted to go through these. But I'm not going to expand it ANT to POST because it just interpolates it too big and too wide, and it doesn't turn out nice. And usually, if I need extra dose ANT or POST-- or not ANT, sorry-- SUP and INF. I'm just going to hand-draw that in later after the optimization and optimize on that and see if that I can get that dose to those areas. But I don't do it with this structure.

And this is my Bladder OUT. I probably should have really done these with different colors. I thought I was creative doing it the same color, but I don't think so-- sorry. So the yellow, bigger one is my bladder, and the yellow, smaller one is my Bladder OUT, And that's the trick structure that I use to optimize and push on that bladder. And that's going to be cropped 5 millimeters outside. For a head and neck, I'll do 3 millimeters, but for a pelvis, I'm going to do 5.

This is a rectum out. I did do different colors on this one. The rectum was brown. You can't see that at all, so sorry. The white is your Rectum OUT structure, and that's what I'm going to use to push on that as well. That's cropped 5 millimeters as well. Yeah, sorry about the color scheme.

This is my POST avoid. What I do is I extend that rectum 5 cm, and I keep going until it's at the edge of my body or outside of my body. and then I crop it into the body so that it's even with the body structure. And that's cropped, actually, 1 cm away from the volume. And again, I'm going to use these type of structures on anything pelvic-related. It's not just because it's a prostate. That's just the simplest thing I had.

And I'm going to ask for a max of 50% to go to this structure because I like to keep 50% around and away from the rectum. Some people don't, but I really like to push on that hard. And it'll make my plan a little bit hotter, but I know that I can get it there with these structures that I have. and it just allows-- shoot. It allows the dose to bend away. Where am I? God, that is not the right slide. Yeah, so would it will allow the 50% isodose line to bend away from there.

So this is a trick structure I use. It's called a Rectum Avoid. A lot of people, I guess-- I was told they've never heard of something like this. But all I do is I take that-- the rectum-- out, and I crop it out of that posterior avoid. So that's actually just, if you can see the orange, it's also the rectum in there as well as the brown, but you can't see that. But that orange is just a 5-millimeter structure, and I push on that as well because the optimizer is actually really--

[SNEEZE]

--bless you-- better at optimizing on smaller structures than it is a larger structure. So that's why I have this in there-- because it'll just help me push it just that little bit more, and it'll listen, actually, pretty well

This is a Rectum IN. You can see this one a little bit better, this blue structure. And that is actually just-- it's going to help me control my hotspot because I don't want to put a hotspot in that rectum, right? That makes sense, especially if I'm going to a higher dose. And I'm going to ask for a 0% to go to that, because that's what's going to help me really control that hot spot.

There's a Bladder IN, which is the same thing as the Rectum IN. It's just a structure just to help me control that hot spot. I don't want to put any hot spots in that area, and because it's overlapping, that's how I'm going to be able to control that a little bit better. I listen to it-- or, it listens to me. Ah, "I listen to it." It listens to me pretty well.

I will tell you that I enjoy using the EUDs. I don't really like to use uppers. The EUDs seem to listen to me a little bit better. I like the EUDs because it can still work on what I ask it to do. It just doesn't penalize me so much on the PTV that the uppers would, actually, do. So once it hits, when I ask it to-- like say I set 0 to 5,600, and once it hits that, it actually keeps dropping below that. It's not like a definitive, like, it'll stop there like it does with an upper. So that's why I like it.

This is what I use. Sometimes I use two ring structures. Sometimes I use three. If I use two, it's usually in the pelvis. If I use three, sometimes it's in the head and neck area. I'll start with rings, but if this is something I'm really pushing on, I'll let go of the ring and I'll let push on that structure more. Really, it's dependent.

But right now, for something that's small and circular, I'm going to use a ring, oftentimes. And this is actually just a 2 cm expansion from the PTV, and I control the 50% isodose line with this. So I'll ask for 0% to get 50, and it just makes it nice and tight around the volume if I'm not pushing on anything drastically hard.

And all that is-- and what I do with this structure, actually, is I don't do the whole body. I crop it down with the VOI box so that it's really just a smaller area around it instead of using the whole body. Because, again, optimizer has a really tough time with something that's really big. It listens a lot better to something that's smaller.

So if I'm doing something that's this much of the body instead of this much of the body, it's going to listen to it a lot better. I don't really care what's out here because I'm not putting any beams through here. I want it to listen to what's up here, so that's the reason why I do that with the VOI. And it actually listens a lot better when it's something like this instead of something like this, because you have something like this. It's already called the body.

And then this is your-- I call it the Ring80, and this just controls my 80% isodose line. So it's actually cropped 1 cm away from the PTV and it's 1 cm thick. And really, I can tell it 0% to get 80% of the dose, and it listens pretty well. I don't have the use a VOI on this because it's just really 1 cm.

So again, with matrix structures, I'm going to use two arcs. They're going to be something-- when I'm using two arcs, it's going to be something, a small, round, simple structure like you're going to-- like a bladder or a prostate. That makes sense.

Our first arc will probably be between 5 and 30 degree collimator angle. I don't use a 0. It's just something you shouldn't be using with the machines. A lot of times, people default to 30. A lot of times people have a number that they default to.

I don't default to anything because each patient is individualized, so I always am going to rotate that. I'm going to watch it, rotate it around the patient in my beam's eye view, and I'm going to go based on what the rectum looks like.

But a lot of people will default to 30. Especially, sometimes, I've seen people default to 30 always in the head and neck as well, but I don't do that. So if you're asking me that, I don't do that.

And then your second arc's going to be a 90-degree collimator, and that's because we're going to want to protect your rectum, your bladder, or anything like that that's coming in like this. And that 90 degree allows the MLCs to go like this around it. So I hope I'm not boring anybody.

So sometimes, if I'm using-- well, I've gone up to four arcs before, but that's usually for, like, a GYN patient that has all the nodals and such involved. Like I said, your first arc, again, is going to be between 5 and 30, and that is really, again, because of what I said for that rectal volume.

And then, your second and third arcs are going to be offset a little bit like this or this, depending, and we're going to go between 80 and 90 degree and 90 and 92. And that just is going to help me, again, with the MLCs.

And we're going to have some much-- if I'm going to do a three arc-- which, I'm using my hands so much. I'm sorry One of my arcs-- so I don't know how to explain it. My arc, my x here, my arcs-- they're going to overlap. So I'm going to have this much on my second arc, and then I'm going to drop it down to this much on my third arc.

And that's because of the x jaw. The x jaw can only go 15, or else it's going to have a problem, and we're going to just-- it's not going to be able to close, and you're going to have leakage there. So that travel on that x jaw going to help with the overlap in the middle of the PTV. So it's going to look something like this, right?

So you've got a little bit of, maybe, 2 cm superior to that cross hair, and then we're going to go-- so that's what our second and third arcs are going to look like, right? So something like this. See how the arcs are kind of like this, or the angles are like that. They're not straight up and down, and that helps a little bit. Again, this is a GYN cancer, so I did a little bit different than a prostate.

So this is just a little bit-- I make all of my changes upfront in the optimizer. So again, this is version 15, and this will show you. So you've got MR level 1, and it goes all the way to MR level 4. As it starts out it, it has, like, what? 10 beams, I think, initially.

So I'm telling it to push, push, push, on this, and it listens to me pretty well. But this is where I'm going to use all my EUDs, and I'm going to make it just listen to me. And then, as it progresses, I might make a couple of tweaks here and there, but every time that it spikes and it goes up to the next level or next step, that's where I pause it and let it go smooth out and flatline. Not everybody does that. I like to do that. I've found that it works better for me.

I babysit it, actually. So I'll watch it. I'll watch it, the optimizer, drop down to like two-- I don't know. It'll start at, like, 5,600, say, and when I put it in the EUD, and I'll say, OK, drop down to 5,400, I'll drop down by 200 steps, and I'll babysit it, and I'll watch it. If it keeps going, then I keep pushing it. If it stops and it's fighting me, it's making my plan hotter, then I stop there. But that's what I do, is I babysit it. And so I spike-- or, when it spikes-- that's when I pause it and I let it smooth right out.

But again, I'm going to make most of my stuff upfront. I think one time somebody said, here, you're picking apples from a tree, but you really want to pick pears. But then, when you get down to level four is where you're picking up a pear from pear tree. So it's kind of like apples and pears. I don't know if that makes sense.

[LAUGHTER]

Maybe not. It makes sense to me. Sorry.

AUDIENCE: [INAUDIBLE] [LAUGHS]

SPEAKER: I stay in my hole, pretty much, so-- So then, sometimes people ask about the NTO. For GYN, this is pretty much what I'm going to use. My priority is 100 to 150.

So all my targets, if I'm going for my targets, I usually put them at 125. All my optimization structures, like my Bladder IN or my Rectum IN, my priority is 65, my body's 200. But that PPTV, I'm going to have an upper and a lower on that and it's a priority of 125.

The PTV, I'm going to have two lowers on it. I'm actually not going to have an upper on it. The body, I'm going to have a priority, like I said, 200. Sometimes, if it's hot, I'll keep pushing that 200. Sometimes I'll put on two uppers so that it listens to me really well, because sometimes it listens to two uppers rather than just one upper, and I'll decrease the one dose.

So let's say I'm at 6766. That upper, I'll drop it down to 6761-- 5 points lower-- and it actually listens pretty well, and it'll cool it down. And then I'll do my distance from my target at 0.5 cm, start dose at 95 and dose at 60, and I'll do a range of 0.05 to 0.3.

Most of the time, I'm doing 0.3 in a head and neck. I don't usually do it in this. It depends on, actually, what I'm doing-- maybe SBRT. But that just controls the slope of your fall-off-- which, I didn't realize all that got cut off, but it's pretty good.

[MUSIC PLAYING]