MITRAL VALVE REPAIR
WAKE FOREST UNIVERSITY BAPTIST MEDICAL CENTER
WINSTON-SALEM, NORTH CAROLINA
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NARRATOR: Welcome to Wake Forest University Baptist Medical Center. You're just moments away from seeing a mitral valve repair live. When people experience degenerative mitral valve disease, the workload on their heart is dramatically increased. If left untreated, it can lead to debilitating symptoms, including cardiac arrhythmia, congestive heart failure, and irreversible heart damage. The preferred treatment for patients with mitral valve disease is repair of their native valve. The advantages for the patient include improved life expectancy, avoidance of long-term anticoagulation, and better preservation of native heart function. OR-Live makes it easy for you to learn more. Just click on the "Request Information" button on your webcast screen and open the door to informed medical care. Now, let's join the doctors.
00:01:20
A. ROBERT CORDELL, M.D.: Good afternoon and welcome to Wake Forest University Baptist Medical Center. My name is Dr. Robert Cordell. I'm professor emeritus of cardiothoracic surgery here at Wake Forest. We want to welcome all of you to this webcast. Today, as you heard, we are going to show you a repair of the mitral valve and I would like to remind viewers, if you have questions, please feel free to click the "MDirectAccess" button on your screen and you can make an appointment, request more information, or make patient referrals. I want to begin by introducing our surgeons: Drs. Neal Kon, who's chairman of the department of cardiothoracic surgery, Dr. Edward Kincaid, who's an associate professor, who can bring us up to speed on today's patient and where we are at this point in this surgery.
00:02:27
NEAL D. KON, M.D.: Thank you, Dr. Cordell. Welcome to our operating room theater at Wake Forest University Baptist Medical Center. We are operating on a very sweet lady who is a retired dental assistant who suffers from mitral valve prolapse. She has had about a five-year history of known mitral valve disease and was followed by Dr. Ray Jorgensen in Statesville, who I hope is watching this telecast. We have exposed the mitral valve after stopping the heart and we have already closed the left atrial appendage, so I have things pretty nicely set up to demonstrate for you the pathology in this mitral valve. You can see here – can you turn on the headcam, because I think they'll get a really good view? Great. This is the anterior leaflet of the mitral valve. This is the posterior leaflet. If you look at her mitral valve, you can see that the height of the posterior leaflet is relatively small for most mitral valves, but as you look at this heart, you can see

that the annulus is significantly dilated, so she's going to need a reduction annuloplasty, which we're going to use a Simplici-T annuloplasty band for, which I will show you later. When we start working again, I'm going to have Dr. Matyska, our anesthesiologist, show you the echo that we got. The echo had two jets, really, in the area of A1, which is, when we look at the mitral valve, this area is A1, this area here is A2, and this area is A3, and we call this area, the posterior leaflet, P1, P2, and P3. I'm going to show you all the chordal structures and everything here, because we really do have a beautiful view. Can you see right here? This is the anterior papillary muscle. That's the muscle inside the heart. And these are what we call fan chords, right around the commissure. The commissure area looks a little bit wide here and we're going to make that smaller. These are chords to the posterior leaflet from the posterior part of the anterior papillary muscle here. I have a string right around the middle of A2. The chord here looks like it's probably a little bit elongated and everything from A2 to A3, to me, the chords look the proper length. These chords are elongated, which coincides with the jets that Dr. Matyska saw in the echo. She saw two jets. One, I believe was probably going through the hole here, and then she saw another posterior-directed jet, which I think is from this region here. So what we will do is we will rebuild chordae tendineae from about here to right around, right here and I think that will take care of it, along with an annuloplasty ring. I think that will take care of her mitral regurgitation. So I'm going to turn it over to Dr. Matyska and let her show you the echo, and I'll start putting some annuloplasty stitches in and then I'll start working on the valve.

00:05:48

JOANNA MATYSKA, DO: Good afternoon. I'm Joanna Matyska. I'm one of the anesthesiologists at Wake Forest University Baptist Medical Center, and as Dr. Kon was already telling the viewers about, I would like to start with the four chamber view, which is usually the first view that we get when we do our TE or transesophageal echo exam. So this is a four chamber view, and the name implies that we are looking at four different chambers of the heart. I'm going to use my pointer to actually outline the anatomy of the heart. This is the left atrium right there. This is the left ventricle. This is the right ventricle, and this is the right atrium, right here. Right in between those ventricles, there is a interventricular septum, and partially coming in and out of view there is an interatrial septum right there, where my pointer is at this point. This is the mitral valve. This is the valve that Dr. Kon and Dr. Kincaid are repairing today, so as Dr. Kon was showing you on his overhead camera, the mitral leaflets of the valve are coming in and out of view. Again, this is the posterior mitral leaflet and the anterior mitral leaflet. Right here you see another valve. This is a tricuspid valve. It separates the right atrium from the right ventricle. Again, the mitral valve separates the left atrium from the left ventricle. Let me show you the close-up of the valve that Dr. Kon is currently working on. This is the mitral valve. Here, what we are looking at, two different views of the same valve. One is a just 2-D view, or two-dimensional view, and the other one has color on it. So, right on this side of your screen what you are looking at is the scale of our mitral regurgitation jet. So every single time the heart goes into systole, rather than the blood being pushed into the aorta, part of that goes back to the left atrium and it creates this jet right there. That's what I'm referring to, the color of our screen. What we're

looking at here is two different parts of the valve. This is the posterior mitral leaflet and the anterior mitral leaflet. Right in between those two jets, there is a small opening, a coarctation defect, and that's how the blood is getting from the left ventricle to the left atrium. So let me show you a different view of the same valve and – Just give me a second, please, to find the best one for our viewers. So, this is a long axis view of the mitral valve, and again we are looking at the jet of the mitral regurgitation, wrapping around the posterior part of the left atrium. So, as Dr. Kon already mentioned, this jet is directed posteriorly, and again we are looking at the posterior mitral leaflet and the anterior mitral leaflet. This is the left atrium and the left ventricle. Right here, we see what I was telling you about a second ago, about the blood going into the aorta. That's the way the blood usually goes, right through the left ventricular outflow tract and goes through the aortic valve right there. This is a different view of the same valve. What we usually do when we get our TE exam, we try to see the best location and the best view for every single pathology, and right now we are trying to visualize both jets, and if you look closely, you're going to see two different jets originating from the same coarctation line, right there. So it's coming in and out of view again because the heart is hyperdynamic at this point, so we have two separate jets and I hope you are also able to see what I am looking at. Since I mentioned the aortic valve to you, I would like to show you a different view. This is called the right ventricular inflow-outflow view. What's so special about this view is that there are three different valves that we are able to look at at the same time. This is the aortic valve, this is the tricuspid valve, and this is the pulmonic valve. So just by looking at this view, we can pretty much see that the aortic valve is normal. There is no regurgitation present. The tricuspid valve shows a little bit of the backflow right there, so we are going to call it probably a trace tricuspid regurgitation. In terms of the pulmonic valve, there's a small jet going in and out of view right there, so we are going to probably call that trace pulmonic regurgitation. Just one more view. This is a long axis view of the aortic valve. Again, we assess it routinely to make sure that there is no aortic regurgitation present. That will be it. Thank you.

00:11:32

NEAL D. KON, M.D.: If we could have the head camera now, I'll show you what we're up to with the mitral valve. I think you can appreciate here now how this chordae tendineae is too long right here, compared to the ones next to it, and that, along with the annular dilation, I think, is the principle reason this valve is leaking. So what we're going to do is we're going to do chordal replacement here with Gore-Tex chords, as I mentioned before, from here to about this area here. Now the way we decide the correct size is we take a caliper here and Dr. Cordell has some slides which he'll show you later that show this caliper more, and we can measure what the chordal length is supposed to be here. While Dr. Matyska was talking, I measured the chords all around the posterior leaflet and they were all about 15 millimeters. The chords right up here are maybe 15 millimeters and then over here, this one is longer. So what we're going to do is we're going to reconstruct chords that are this size and what we do is we make preformed Gore-Tex chords, and I think the overhead camera might show this better. I take a piece of CV5 Gore-Tex suture and on this measurer, which makes me make these the perfect length, we take a few throws, lock it. That's two chords. This will

make four chords. This will make six chords. Can we have that needle holder, Terry? I pass the needle through these loops to lock them all together once, so they don't slide away from me when I'm working inside the heart. Okay, and we're going to attach these chordal structures to the papillary muscle. [unintelligible question] This is probably – This is the tendonous portion right here, the papillary muscle, which is quite strong, and we are going to put the needle right through here and attach these new chords to the papillary muscle and I am going to take two bites, two nice good bites that I know are going to hold really well. And let me have the hemostat. Keeping a hold of these chords really helps you with – I mean, of the Gore-Tex string, really helps you expose where you want to put these sutures, and you can see I have a, as the British say, a lovely view of the mitral valve.
00:15:30
A. ROBERT CORDELL, M.D.: Yes, as you can see, he has a very good view and he is attaching one part of that chord to the edge of the anterior leaflet of the valve and then he is moving the other one down to the papillary muscle so that with his prior measurement, he is going to hopefully find when testing later that that valve is totally competent, which means that under pressure and the ventricle beneath that level that he will have no leak from that valve when it's closed. Incidentally, we are ready to accept some questions if you have them. I have three or four that I will discuss with you in just a few moments. But in the meantime, I'd like to show a few slides of this, which might be easier for people to understand. So let's see what I can do here. Well that's a good slide to show. Can you see that on the screen? Can we see the screen with the slide? As you can see, the [unintelligible] is pulled up to show the broken chord. In this patient that we've just seen, the chord is really – There are more than one chord. There are two or three more, but they are a little bit further up, toward the top of that opening. This is the measuring caliper that he used, which you can see then can be adjusted up there so that he can know exactly what length of the chord that he wants to maintain and retain before he sews it in. This shows it being measured there, which is a good examination to show you both the papillary muscles below, the pink area, and the chords, which normally are along the edge or the anterior leaflet and the posterior leaflet of the valve. This shows you how he just tied them down in preparation for sewing them to the edges. There's one in place, about to tie down on the papillary muscle, after the pre-measuring and the sewing, so hopefully that will help immensely in terms of keep that valve leaflet from fluttering up and leaking under pressure. There's another one. This is again showing how to make the chords. Alright, Dr. Kon?
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NEAL D. KON, M.D.: Yes.
00:18:31
A. ROBERT CORDELL, M.D.: Where are you right now?
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NEAL D. KON, M.D.: Okay, if you turn the head camera on, you can see these loops of chords coming from the papillary muscle that we've created. I have a suture looped around each one and I'm going to sew these to the free margin of this anterior leaflet of the mitral valve and hopefully that's going to fix this area of regurgitation. So let's see, where's the first one here?

00:19:03
A. ROBERT CORDELL, M.D.: We can show you how those sutures have been place already in the papillary muscle and then they have been brought through the leading edge of the anterior leaflet of the valve. Eventually, they'll all be placed in position and tied down, as you'll see in just a little bit, a little while later. But they probably will go mostly in those that you see there, plus up there on the commissure to your left in the slide, where you saw most of the leak occur on the sonic study. I have a few questions, which I think I'll read first to you and then comment on them. This person says, "I'm told that I need a mitral valve replaced. I read the difference between the tissue and the mechanical valves. How is the valve attached to my existing tissue, and could the new mechanical valve leak?" My thought about that is that, yes, it is possible for some leakage to occur with a mechanical prosthesis, usually because of the in-growth of some fibrous connective tissue which impairs the solid closure of the poppet within the mechanical valve. It's not common and it usually occurs over a period of years in some patients, but the amount of loss in terms of the mitral valve function is highly variable and probably not something that you would expect early, but nevertheless, it's wise in these patients to have occasional sonic studies or echo studies in order to judge the progress of things and to see what the function, not only of that valve, but also other valves, is. Did we show the last slide there, with the sutures in place? Okay. I have another question that I'd like to read to you, "I was diagnosed with mitral valve prolapse nine years ago. I've never been on medication at all. I noticed I only experience chest pain when I'm really tired or carry anything that's too heavy for a long period of time. I just wanted to know if I would be considered a candidate for MVP repair or surgery." Well, I would certainly think so, but it depends entirely upon what the degree of your mitral insufficiency or regurgitation is and whether or not there are other features about your heart which might help to explain your symptoms better, such as coronary disease or other heart muscle dysfunction, and that should be studied, as was in this patient. She underwent coronary studies prior to any decision being made about the repair of her mitral valve. In the event that if such surgery should occur, you can repair or bypass obstructions in the [unintelligible] at the time of the initial surgery. I don't know what kind of degree of prolapse you've been found to have. By and large, we feel that significant regurgitation of the mitral valve, even in the presence of a normal function of the heart, which is also measured routinely with echo sound, should be considered for repair, and I should add, we're talking about repair today. It's been shown in recent years that the incidence of replacing mitral valves is certainly on the wane for the vast majority of patients in that various of repair techniques have been developed and have been shown to be very worthwhile long term. They function well with a minimum amount of potential complications, so I think that's important for all of you who are watching this procedure to be aware of, and particularly of course those who have any mitral valve disease. Efforts, we fell, should be made to repair all these valves if possible. Sometimes it is not possible. Sometimes these valves are heavily calcified and like rock and obviously have to be either removed or, carefully done removal of clacks in order to make the valve more functional. I have one other question that I'd like to discuss with you a bit. This mother says, "I have 11-year old twins. Daughter, coarctation of the aorta. Son, tetralogy of

Fallot. Son had his second open-heart three years ago, during which they placed a Gore-Tex pulmonary valve, 24 millimeters, adult size, in place. It is now significantly leaking. I'm looking for an appropriate heart valve that will keep him off the table longer. He will need to replace this in the not-too-distant future." That's an understandable and difficult question, primarily because of the fact, as she well knows, children, as they grow, obviously change characteristics, tissues change, and sometimes you get into more trouble with functioning valves, even mechanical or tissue valves. But I am not certain in my own mind as to what kind of tissue valve should be used in this patient and the reason being primarily, I'm not a pediatric cardiac surgeon, but we have them here and I'll be happy to confer with them and we'll answer our opinions here based on the knowledge gained at this center. If you'd let me know your name and your address, if you'll send it to me, I'll see to it that we process it. It's A. Robert Cordell, Department of Cardiothoracic Surgery, Wake Forest University Medical Center, Winston-Salem, North Carolina 27157. Could you update us, Dr. Kon?
00:26:35
NEAL D. KON, M.D.: Sure. We have put in these Gore-Tex, you can see right here. We're giving some cardioplegia, so the field might get a little wet. Ted, if you could put a sucker right there, that might prevent fluid from coming off. You can see these loops are attached to the free margin here now and we have six of them covering this area. Looking at the valve, even though it didn't really look like it on echo, this area of A1, I mean of A2, looks a little bit prolapsed and even as we move on here, so I think I'm going to build two more loops of chords here before I quit with the chordal building, and then I'm going to put the annuloplasty ring in. I don't have a screen to see what you're seeing. I don't know if you all saw me put in the annuloplasty sutures, but these are the sutures for the Simplici-T annuloplasty band we are going to use. My pick-up here is at the left fibrous trigone of the heart. Can you see that? And then we have sutures that are mattress sutures that go around the annulus of the valve all the way to where my pick-up is now, which is the right fibrous trigone of the heart. Now the way the Simplici-T band works is – You can see the width of the sutures here. If I want to make this annulus smaller, every time I pass one of these sutures through the band that has a width this great, if I put it in the band at width this great, I will reduce this area by probably 40 to 50 percent. And that's how we're going to reduce this annulus size with the annuloplasty ring, or annuloplasty band. Let me make a few more chords.
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A. ROBERT CORDELL, M.D.: While he does that, why don't we look at the slide which demonstrates what he has just told you, in terms of placing these sutures, in this case, on the slide, it's really around the posterior annulus and by virtue of gauging the distance between these sutures, one can eventually, you see, either reduce the size of that annulus and tie it down, whenever he's ready to complete the insertion of the band, which runs about three-quarters of the way around that rounded leaflet, ending up there where you might see the suture about to go in. Hope that's clear, but it's different from the original measurements that have traditionally been placed in the mitral annulus, where in the past and still some today, rings are available which are put down over these just to measure them and come to a conclusion about what size ring you were going to put in, but this

is only a three-quarter ring, which again is a relatively new technique in terms of mitral valve repair. Dr. Kon, they ask if you know the identity of site for this caliper that you're using.
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NEAL D. KON, M.D.: It is a company named EZTECH. This technique of chordal replacement was developed by a surgeon in Germany, named Fred Moore. Very simple but very ingenious to make sure these chords are the correct length and along with EZTECH, which is a surgical supply company, they sell these calipers, and they're called the Moore calipers. We're attaching another two chords to the papillary muscle here. You can see we're in the tendonous portion.
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A. ROBERT CORDELL, M.D.: Dr. Kon, how do you know when you are able to repair a mitral valve instead of replacing it?
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NEAL D. KON, M.D.: Well, that's a wonderful question. I think it has to do with the pathology of the valve, so I would say if you have degenerative mitral valve disease like this young lady does, you ought to have a very high repair rate in the 90-plus percent range. If you have rheumatic heart disease, you are way less likely to be able to repair the valve, and rheumatic disease today has probably the poorest long-term results with repair. Many of those valves get replaced. Endocarditis is kind of a toss-up, depending on what has been destroyed, whether or not you'd be able to repair endocarditis or not.
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A. ROBERT CORDELL, M.D.: Well, tell me this. How do you know when you're able to repair a mitral valve instead of replacing it?
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NEAL D. KON, M.D.: Well, if there's pathology you can fix, we – Degenerative mitral valves, usually, you can – Let me just get this little loop through. Can you grab that, Ted? Through this side, I want to bring it to this side. I'm just concentrating on one thing right now.
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A. ROBERT CORDELL, M.D.: Well, it's an interesting question and I think an important one but I think, frankly, the surgeon, particularly upon examining the valve, will have a pretty good idea in these days and times about whether or not he can salvage it, and I think that's a very important point of knowledge, particularly as it goes to experience and available techniques, which are coming along all the time, and hopefully to better the outcome and to address the longevity of such a repair. That gets me to another question, which has just been sent to me and that is, "Have you ever had any cases where the suture has not held up under the strain or the vessel has withered and torn?" Have you ever seen that, Dr. Kon?
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NEAL D. KON, M.D.: I have and it's usually the result of a inefficient annuloplasty, because you can see the chords and the suturing you put in. If you have a good [unintelligible] coaptation at the end, where the valve doesn't leak, the stress is taken off the chordal structure. But as the annulus dilates and the valve leaflets don't come together as well, then you have more pressure on these chordal structures and they're more likely to leak or break or – I've just about

got as many chordal replacement sutures in as I would like. But the question that I stopped talking about, about who should get repaired, and when you can. I'll tell you, the cardiologist who does the transesophageal echo is really the lead person, because they see these patients first and they should be well aware of which valves can be repaired or not and Dr. Matyska could point out pathology that she knows her surgeons that she works with can repair or not. And that's where you can pick out where a degenerative valve is and what needs to be fixed. In this repair, we are using the echo guidelines very – We're paying very much attention to where the echo said this valve was leaking to help us repair it and I think this patient's going to do very well with this repair. Okay, we're going to be tying down this last chordal replacement loop. So we've really rebuilt two-thirds of the chords that go to the anterior leaflet here.
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A. ROBERT CORDELL, M.D.: While he ties those down, we have a question about, "How long can you keep a person's heart exposed while doing this procedure?" Actually, with today's techniques and with what is going on right now to keep this heart protected, one could do this for a number of hours and that's not uncommon, particularly if you're doing combined procedures on a given heart. So it's in terms of hours and, by and large, with temperatures kept down on the heart muscle, the entire heart really, and with regular injections of worthwhile high-oxygenated blood into the heart muscle, through the coronary sinus, which is what's going on here at intervals, you protect the heart and we'll hopefully see this heart regenerate or repen and re-beat and come back to a more normal appearing heart once this is finished and things are closed. He's doing a test right now of the valve.
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NEAL D. KON, M.D.: You can see there's a leak right – There's a leak along the margin. I really don't think this is very significant right now because the leaflets coap pretty well and the problem is this annulus has to be reduced. So I'm going to go put the annuloplasty ring in and test again. Let me take a valve hook and I'll show you how these chords are all replaced here and they should all be the right length now, you can see, and they're attached to the free margin. So, I think this should work quite well when we get the ring in. This is the Simplici-T annuloplasty ring and this ring was developed by Dr. Tyrone David, who is one of the great innovators in our field, and again it's something that has simplified mitral valve repair. We just take a band and the size of this band will be as a result of how much we decide to take up the annulus between sutures, and I can see how wide the sutures are in the heart and I'm going to make each one the distance between these mattress sutures less on the band.
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A. ROBERT CORDELL, M.D.: A quick slide will show you that in detail. It might be easier for some to understand it. If you look at the placing of the band sutures in this slide, you'll notice that they've been largely completed in their position, but you'll notice that the size of the suture width along the heart edge, the annular edge down below, is greater than the width of the suture placed, that same suture placed into this band, which is held there by the handle. So the result of that is, when you finish with those and you tie them down, you cut off the excess as you see in that slide, and you push them down, you have resulted in a smaller

annulus. That's what Dr. Kon is talking about at the moment. Even though that commissure, the edge there, where the two leaflets meet on the left, was if you remember the primary site of the leak, he felt and probably it's true, that a good part of that leakage was due to the fact that the overall annulus or size of the ring around the valve was too great, so he is reducing that and will again check it shortly to be sure that the valve is competent prior to completing the repair. I have a question about our patient today, which might interest people. "Did the patient present with an increased left ventricular volume or hypertrophic myocardium due to the regurgitation and resulting cardiac insufficiency?" Yes, the left ventricular diastolic dimension was 56 millimeters, where a normal is at 35 to 52. There was severe eccentric mitral regurgitation, which you heard earlier, but the overall function of the heart is essentially normal, based on a percentage function, which in this case was 50 percent. She had had numerous bouts with palpitations and occasional chest pain, if you remember, and other worrisome symptoms which were the cause for occasional visits to her cardiologist and also were the cause for doing studies on her coronaries, which were found to be normal. So we would feel that certainly in a case like this, this merits correction and hopefully repair, and it certainly protects the heart as time goes on and as patients are put under increased stress and strain. Another question: "I will have mitral valve repair in December. I also have some degree of aortic regurgitation. What affect, if any, will the mitral valve repair have on the aortic regurgitation or any change to the aorta, which currently measures four sonometers." Well, I don't know that it's going to really change the degree of aortic regurgitation, but it might well be that, if the surgeon is able to do so, he could repair the aortic valve regurgitation at the same time that he does the mitral repair. The current diameter of four sonometers is slightly above normal, but not crucially so, but nothing I would feel should be done to change it or repair it at this stage.

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NEAL D. KON, M.D.: We are putting these sutures in the annuloplasty band. It's a flexible band and we like to use the flexible band because it allows the mitral annulus to change it's shape during the cardiac cycle. We have put the sutures in the band that we had previously place in the annulus, and now we're kind of organizing them. We're releasing the band from the holder and we are cutting the excess of the band. Now we're going to lower the band in place. Pull up on each of these sutures. There you go.

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A. ROBERT CORDELL, M.D.: If you look at the slide, you'll see that being done in a similar fashion.

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NEAL D. KON, M.D.: And you can see that that's going to lower the band and that's going to increase the coaptation between the anterior and posterior leaflets of the mitral valve, when we get it sewn in or tied in. I'm going to start here at the left fibrous trigone with the first stitch, and I just kind of go from side to side as I tie these. I've worked with several different annuloplasty bands and the reason I like this one is that it conforms so nicely to the mitral annulus.

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A. ROBERT CORDELL, M.D.: We have a question. "How are you able to show such close-up images of the surgery, or are you using a special camera?" Well, I'm not an expert at cameras. We have excellent people here who are doing a superb job in our opinion. It is a bfw, through the lens, headlight camera, if that means anything to those of you who are watching us. But, we feel that everything is very clear and I hope it is for you. What do you think or estimate at this point, Dr. Kon, that you are doing in terms of reducing the overall annular size?
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NEAL D. KON, M.D.: Ooh. You know, there is a little bit of an art to surgery and you kind of look at things and say, "What's supposed to be the right size?" but I would say we are reducing this by maybe 50 percent almost. We're reducing it by a lot.
00:46:16
A. ROBERT CORDELL, M.D.: Which is a very significant decrease.
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NEAL D. KON, M.D.: At least that's what I did with each of these sutures. And when I looked at the valve, that's what it looked kind of like it needed to me, so people say this is one that you – The annuloplasty band, when you use a band like this and everybody says, "Well, how can you use the same size in every person?" You can tell we've cut off some excess and we're not using the same size in every person. Every person gets a different size, but we decide how to take it up and you take up the annulus between each mattress suture. You don't take up the annulus based on selecting a size ring, as much as you do how much you're going to take up with each suture. It's called a selective annuloplasty reduction.
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A. ROBERT CORDELL, M.D.: Well, it's very impressive, I think, and in my opinion, certainly represents a step forward. Dr. Moore's done a great deal of help, been a help, to surgeons around the world in developing this technique, and I understand that he is an excellent surgeon, not to be surprised.
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NEAL D. KON, M.D.: Well this is looking better and better as we tie it in, which is always satisfying to the surgeon.
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A. ROBERT CORDELL, M.D.: I'd make one remark, maybe it needs more emphasis, and that is, as you remember, right before we began the mitral valve work, you were told that we excised the left atrial appendage. Why would we do that, even though to our knowledge, it contained at this time no clot or other abnormality? Well the reason is that one of the greatest causes for stroke in any kind of cardiac situation is more likely to come from clots which form in the left atrium and eventually are freed and embolized to the brain. So it's a part of the overall technique, which is considered and is very important for that patient's welfare, not just now, but in the future, and it doesn't incur any significant risk to do. Are these sutures synthetic or are they plastic or what?
00:48:58
NEAL D. KON, M.D.: Well, Dr. Cordell, you taught me how to do this, so you know better than I know, but this is braided dacron.
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A. ROBERT CORDELL, M.D.: Yeah, I think it's dacron. That's right, it is.
00:49:09
NEAL D. KON, M.D.: Interesting thing for our medical center here today is, usually I'm more polite and introduce everybody. I did introduce Dr. Matyska and Dr. Cordell introduced myself and Dr. Kincaid, but Sid Lavender is here and he worked with Dr. Cordell for a long time, and he's the physician's assistant working with us today and he's our second assistant. [Terry Ballard] and Scott are our scrub and [Terry] has scrubbed for years and years with me and she's a fabulous scrub nurse. [Tracy] is circulating. She is our coordinator. [Laurie Graff] is on the pump and she's doing the perfusion, and if I missed anybody, tell me quickly because I'll be embarassed. Oh and [Phyllis] is with anesthesia, helping Dr. Matyska. Now, here's the valve and I'm going to test it. And you can see we have a nice coaptation. There's no leakage here and I think it's going to work great. I'll put a little more in, put it under a little more pressure. Let's have a nerve hook. And you can see the gush of fluid outside the ventricle, which indicates it's a competent valve. I'm not sure if anybody mentioned -- if I mentioned in the beginning, but we did amputate the left atrial appendage. Here's the suture line from the amputation of the left atrial appendage and we oversewed it so that there's no chance of recannulation. We do that – She did not present with atrial fibrillation but she had a strong history of palpitations, which means she might be a person that's highly likely to go into atrial fib and we take off the atrial appendage in the hopes that it would reduce her chances of having stroke from developing clot in the left atrial appendage. We exposed the valve today with the technique we call the superior septal approach and this is the aorta right here. Up here is the right atrium. So what we did is we cut through the right atrium first, down to the fossa ovalis, and then we opened the fossa ovalis, which comes together here, and we extended our incision into the dome of the left atrium, and it really does provide a beautiful view. There are many ways to approach the mitral valve. This is my favorite way and to be able to show you this on the webcast, I think it really gives nice exposure. And I must admit, I do think that the key to getting good mitral valve repair done, is to have good exposure. So we're going to go ahead and start closing. How are we doing on time?
00:52:23
A. ROBERT CORDELL, M.D.: We have just a few minutes left. I'd like to emphasize that exposure of left-sided surgery, because I think if people would use that on a routine basis, they would have much better visibility of any work to be done on the mitral valve. It's a simple thing to do and simple to close and we've done it here for a number of years and have had essentially no problems with it, so it's something to think about, particularly for those in cardiac surgery. And if you can see, he's closing it now, very simply, with running sutures. The patient will, I'm sure, be warmed shortly if not immediately and, as quick as possible, circulation will be restored in order to allow for resuscitation of the heart, which has been totally quiet during this time. How many reinjections of cold blood cardioplegia were given? Does anybody know up here? About every 20 minutes or so, we do that, and it's an important factor in trying to keep the heart as healthy as possible when it comes back to its workload. The vast majority of

these patients restore their cardiac rhythm without having to even be defibrillated electrically.
00:54:24
NEAL D. KON, M.D.: Well, Dr. Kincaid is closing the fassa ovalis, which is inside the right atrium, and we're pretty close to conclusion. It will take us probably about 20 minutes to rewarm the patient and get a confirmatory transesophageal echo study to show that our repair worked. I'm delighted that people came and listened to our webcast, watched us do the surgery. I hope it's been helpful. This is actually the second webcast in valve surgery that we've done here at Wake Forest and we got really good feedback on the first one and I hope this one has been helpful as well.
00:55:05
A. ROBERT CORDELL, M.D.: We would like very much to express our appreciation here at this center for everyone taking part in this webcast. It's gone smoothly, as far as I can determine. I would like to have you reminded again, if you needed any questions answered or at least responded to, please feel free to send them, even later, and if you have interest in having yourself seen here or want appointments or anything of that nature, you should feel free to do so. For Dr. Kon, Dr. Kincaid, and myself, we express our appreciation, not only to Medtronic, but also to all the people employed and working hard to make this sort of webcast possible, and as many of you know, it is a big task to get all the electronics and all of the other features that are necessary for success in terms of trying to provide the best for our audience. Thank you very much.
00:56:29
NARRATOR: Thank you for watching this mitral valve repair from Wake Forest University Baptist Medical Center. OR Live makes it easy for you to learn more. Just click on the "Request Information" button on your webcast screen and open the door to informed medical care.