

**ANTERIOR CERVICAL FUSION  
AURORA BAYCARE MEDICAL CENTER  
GREEN BAY, WISCONSIN  
MAY 4, 2006**

00:00:12

BECKY HICKS, PATIENT: I'm a fixer. I...I like to fix things myself and there was no way I can fix something like this. I needed someone else to do that for me.

00:00:22

It pretty much was not...had...was not without pain at all. Sleeping, I couldn't sleep on my back because it bothered it. It even...I couldn't sleep on my left side, couldn't sleep on my right side. It was just...It was constant.

00:00:36

LESLEY BITTERS, R.N.: The pain and the problem that you're having gets in the way of what you need to do or what you want to do in life, then it's time to take the next step.

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NARRATOR: Over the next hour at Aurora BayCare Medical Center in Green Bay, Wisconsin, you will witness the surgery that helped these patients regain their lives pain free without a long recovery. They were suffering from a ruptured intervertebral disc. Surgeons performed a minimally invasive anterior cervical fusion to relieve the stress and the pain patients can feel in the neck, arms and legs.

During the outpatient procedure, a surgeon reached the cervical spine through a small incisions in the neck and replaced the disc.

00:01:16

RICHARD HARRISON, M.D.: The cervical spine is frequently address...is a frequent problem with troubles. It has a lot of movement. We obviously turn our heads and flex our heads forward and backward, and this can lead to degeneration so it's a fairly common problem that we see.

00:01:31

STEVEN WEINSHEL, M.D.:

What is good about having this operation at this hospital is this hospital, we have a system set up where it's very easy to come into the hospital. You have this operation. You usually go home within a few hours. It's a nice comfortable facility. If people need to stay overnight, we have private rooms. It's...It's very...a very comfortable place to be. We have all the technology that one needs and we have surgeons that have...are very experienced at this procedure.

00:02:02

NARRATOR: You may e-mail questions to the physicians in the OR by clicking the MDirectAccess button at any time. This program represents Aurora BayCare's ongoing efforts to bring the latest developments in healthcare to the community.

00:02:20

MARK GARDEN, M.D.:

Good afternoon and welcome to Green Bay, Wisconsin, Titledown U.S.A. Thank you all for joining us at Aurora BayCare Medical Center for a live look at a procedure to treat what can be a very painful condition. An anterior cervical decompressing...pression and graphing performed for a herniated cervical disc. Hello. I'm Dr. Mark Garden, one of five

neurosurgeons with BayCare Clinic here at Aurora BayCare Center and your moderator for this afternoon's procedure.

00:02:49

My partner and associate, Dr. Steven Weinshel, is performing today's procedure. Lesley Bitters, our nurse coordinator, is also present today. Lesley has been instrumental in arranging our neuroscience program. Incidentally, Lesley has also been a patient who has undergone such a procedure.

00:03:09

Before we get to Steve, a little housekeeping. You can e-mail us questions any time during today's procedure my clicking on the MDirectAccess button on your screen. We encourage the interaction and enjoy the engagement. Now to Steven. Steven, tell us about where you are with the procedure at this point.

00:03:30

STEVEN WEINSHEL, M.D.: Well, first of all, I want to thank everybody. But I also want to introduce Amy Patterson, our surgical technician, and Jamie [Delrow?], our...my assistant and operating room nurse. And Mary Bingham in the corner, our circulating nurse.

00:03:46

We have exposed the patient's neck. We have found the disc herniated. We have found the disc, the proper disc and we know we did that because we took an x-ray. And we're about to put the microscope into the field so that we can start doing the operation. And you'll be able to watch this operation through the same microscope that I am operating through.

00:04:05

MARK GARDEN, M.D.: Steven, I'm going to review the plane radiographs that you have here, that is already marked in...and you have an indicator at the appropriate level. As you can see, this is the cervical spine in a relatively lateral view. And we can...we can number the cervical spine. This is going to be C2, C3, C4, C5 and then, certainly, you see the mark in-between the disc space at C5, 6. Of note is that you see the significant collapse between the C5, 6 vertebral bodies. And indication that pathology is existing. Steven, tell us a little bit about the patient and...and the patient's problems at this...at this point.

00:04:55

STEVEN WEINSHEL, M.D.: Well, this lady has had...This is her second herniated disc. A few months ago we operated on a disc below where we're operating today. She had excellent relief of her arm pain, but unfortunately her arm pain came back. We got an MRI Scan and it showed that her disc herniation had herniated just above the level that we operated on. Because of this disc herniation and her right arm pain, and the fact that she's not gotten better with non-operative, non-surgical treatment, she wanted to have this operation.

00:05:29

MARK GARDEN, M.D.: Excellent. Now, as Dr. Weinshel...as Steven is beginning to con...to place the microscope in the wound and continue with the operation, allow me to show you a MRI Scan of a different patient who has similar pathology. Again, this is what's called a lateral...or a sagittal cervical spine MRI. The patient's nose and face is over here. And of most import, is the spinal cord at this level. This long tube right here is the spinal cord. All this white in front of the cord and behind is good. That is what we wish to preserve. Unfortunately, as we focus in, we see a rather significant compression of the spinal cord due to it...this black object, which is a herniated disc.

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The herniated disc is causing substantial compression on the spinal cord, which is a...a absolute no-no, if you will. We must remove that compression to relieve the patient's symptoms. If the spinal gord...cord continues to be compressed, significant neurologic dysfunction can occur.

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This is different view of relatively the same level, and they're called axial cuts as we go through each of these levels. Of note is that this will be the right side of the cervical spine and this will be the left side. We see a little bit of white in the back portion of the spinal cord, but we see this massive compression that's not only causing left neuroforaminal, or nerve root compression, but also substantial deviation and compression of the spinal cord. This type of picture, along with the neurologic examination, demands surgical intervention.

Steven, what does it look like underneath he microscope at this point?

00:07:27

STEVEN WEINSHEL, M.D.: Well, I'm gonna adjust the microscope so that everybody can see what I'm doing. And what we see in the microscope here is where my...my suction device is touching the fifth bone of her neck. Now I'm touching the sixth bone of her neck. And right in the middle here is the deteriorated and herniated disc. And we're gonna start working on removing that disc to free up the nerve to her right arm.

00:07:58

MARK GARDEN, M.D.: Steven, can you just define the...the levels of the disc and the...and the architecture of the disc please?

00:08:06

STEVEN WEINSHEL, M.D.: Well, the disc has an...a hard outer layer called the annulus, and a soft inter later call...inner layer called the nucleus. And a piece of the nucleus, the inner layer, usually breaks through and pushes on one of the nerves to the arm.

00:08:23

MARK GARDEN, M.D.: Excellent. I am going to use a spine model as Steven continues with the dissection, as you can hear the drilling in the back. If I may, this is the spine model of the cervical spine. This is virtually the way I am looking at you as I speak. The front of my...The front of the spine is here. The back of the spine is at this point. And I'll just turn it around in a lateral view to show you this.

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The anatomical position of the patient is one of the following: The patient is in a supine position. Meaning the patient is looking up and...and we have a roll of...under...behind the patient's shoulders to slightly extend the neck. It is at this point that we define then, before we do the operation, the...the particular levels that we wish to operate on.

00:09:20

STEVEN WEINSHEL, M.D.: Well, Mark, if I can interrupt you for a minute.

MARK GARDEN, M.D.: Yes, Sir.

00:09:23

STEVEN WEINSHEL, M.D.: I'm...Right now I'm taking a knife and I'm cutting part of the disc out, if the microscope is on. I'm taking this knife and I'm cutting out part of the disc.

00:09:38

MARK GARDEN, M.D.: And that outer disc is a fibrous tough material necessitating the use of a sharp object to...to cut into.

00:09:47

STEVEN WEINSHEL, M.D.: And I'm starting to take out the disc.

MARK GARDEN, M.D.: And look how collapsed that disc space is. That's amazing.

00:09:55

STEVEN WEINSHEL, M.D.: We've just been joined by Dr. Max Ots, another one of the BayCare neurosurgeons who's now working across from me.

00:10:02

MARK GARDEN, M.D.: Well, excellent. Dr. Ots, welcome.

MAX OTS, M.D.: Thank you. All right.

STEVEN WEINSHEL, M.D.: You can go ahead, Mark. We'll interrupt you if necessary.  
00:10:11

MARK GARDEN, M.D.: Okay. Yes, well, allow me then to just explain the positioning of the patient, once again, in the procedure. As Dr. Weinschel has stated, he...at the C5, 6 level, he cut into this tough outer fibrous material so that he could enter the disc space itself. Now, the goal of the operation is to eliminate compression on these yellow objects called the nerves.

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In the cervical spine, however, we have this large object called the spinal cord that we cannot manipulate, nor should we manipulate. So the best access is really through an anterior approach so that we are able to then virtually piecemeal or pick off the materials that are causing compression of the spinal cord and the respective nerves.

00:11:03

STEVEN WEINSHEL, M.D.: Mark, if you want to go back to the microscope, I'm taking a high speed drill and I'm drilling away the disc between this fifth and sixth bone. Dr. Ots, every so often, is squirting some sterile saltwater in there to relieve some of the heat and also to wash away the dust that's created by the drill.

00:11:32

MARK GARDEN, M.D.: Under the microscope you have a very...very good view, Steven, of...of the anatomy and the procedure. I hope everyone at home can see that, as this is a live procedure that...I'm just looking again. That is...That is being performed with very good caution.

Lesley, how are you doing?

00:12:02

LESLEY BITTERS, R.N.: I am well. Thank you. I wanted to interrupt you just briefly. We've received an e-mail question from our audience that I thought as we brought the microscope in it would be a good time to address.

MARK GARDEN, M.D.: Excellent.

00:12:11

LESLEY BITTERS, R.N.: One of our viewers has asked if this type of surgery can be done through an arthroscope.

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MARK GARDEN, M.D.: Well, this procedure...We don't do that procedure here at...at Aurora BayCare Medical Center. I think the procedure, especially the one that Dr. Weinschel is performing, is very difficult to do with an arthroscope due to the fact that the compression of the vertebral bodies and also the fact that the disc has a very little area to herniate out into, i.e., into the neuroframe and/or the spinal cord. That procedure, as far as I know, is not being performed with an arthroscope anywhere in...in Wisconsin, as far as I can tell.

00:12:52

LESLEY BITTERS, R.N.: You know, one of the things that impressed me when I started working in neurosurgery too was just how much a neurosurgeon needs to rely on the feel with his instruments through his hands. And that's something that I think would be hard for you to do through an arthroscope. You need to actually be able to see into...to pass an instrument there to feel if there's additional compression or if all of the disc material has been removed and the area is free of compression now.

00:13:17

MARK GARDEN, M.D.: That's a great point. I think using your hands, tactile involvement, along with direct vision is absolutely key to insure that the minimal mor...minimal morbidity

occurs with an operation. And, again, remember we treat patients in this procedure. They have pathology and, certainly, minimizing any morbidity or complications is a key.

00:13:43

STEVEN WEINSHEL, M.D.: Well, Mark, if the audience is in the microscope again, we've removed most of the disc and we are getting very close to where the...where we're gonna be able to see the lining of the spinal cord straight through. I think---

00:13:55

MARK GARDEN, M.D.: Okay. Excellent. Excellent. Lesley, why don't we...Go ahead, Steven.

00:14:00

STEVEN WEINSHEL, M.D.: We now have to work very careful...carefully right in this area, right here where my instrument is, because a few millimeters below this is going to be the spinal cord.

00:14:09

MARK GARDEN, M.D.: Steven has a curettage that is being utilized in order to pick away, if you will, at the...at bone and even the outer portion of the disc to insure that...to insure that there is adequate exposure to the...what we call the thecal sac and then the respective nerves. If we go to PowerPoint, which Lesley has...has brought up, the C6, 7 level is clearly the level of an...I'm sorry, the C5, 6 level is clearly the level of involvement. Within the cervical spine we have seven vertebral bodies and each one has it's own functional capacity, if you will, with nerves emanating into our upper extremities and controlling our muscles.

00:15:05

This is the components...These are the components of the disk that Dr. Weinshel incised and is taking out. Certainly, the outer fibrous material, which is that...the annulus fibrosis. Then we have this lamellae, which is an onionskin type of architecture that is peeled away along with the soft inner material; almost like a crab meat material or a toothpaste like material called the nucleus polyposis. It is the outer fibrous material that had...that hern...that tears, if you will, and that inner toothpaste material, or that nuclear material, emanates out and causes compression.

00:15:44

It should be noted that the reason it...it herniates, or the disc herniates posteriorly is because there's a tough anterior ligament called the anterior longitudinal ligament, which is much tougher than what's called the posterior longitudinal ligament.

Steven, how are things going?

00:16:01

STEVEN WEINSHEL, M.D.: Things are going very well. I now have a little instrument called the punch, that's about 2 millimeters in size. And I'm starting to get underneath the sixth bone to try to remove some of the disc and some of the bone spurs that may be pushing on the nerves in this lady's arm.

00:16:18

MARK GARDEN, M.D.: Okay. That looks like there's a significant amount of osteophyte, or small bone spurs there at this point, which is what you would expect with that collapse.

00:16:28

STEVEN WEINSHEL, M.D.: Right. There is a...There is a bone spur - which is a rigid bone that's compressing her nerves - right there into the fifth bone and that's what I'm trying to bite away now with a tool that's about a millimeter in size.

00:16:47

MARK GARDEN, M.D.: Allow me once again to show on the spine model, if you will, really the positioning in the anatomy, Dr. Weinshel is coming from up here in the anterior approach and after he's dissected multiple tissue planes, including what's called the sternal cleidomastoid muscle. And then we protect the carotid complex, which is a big vessel in the neck laterally and then the tracheoesophageal complex medially, we come upon this

segment of the vertebral body and also of the anterior cervical spine. Certainly, morbidity or complications can occur, and that's why meticulous attention to detail in dissection is vital.

Lesley, shall we go to some more of the Power Point at this...in this situation?

00:17:41

LESLEY BITTERS, R.N.: Actually, we've received a few more e-mail questions that I think this might be a good time to address.

MARK GARDEN, M.D.: Oh, excellent. Excellent.

00:17:46

LESLEY BITTERS, R.N.: As you were just talking about avoiding complications and protecting both the esophagus and the trachea, along with the carotid artery, one of our viewers is wondering if there are chances of damaging the vocal cords during the procedure as well?

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MARK GARDEN, M.D.: Absolutely. The...The vocal cords are innervated by what's called a recurrent laryngeal nerve. And that's a nerve that's...can innervate our...our vocal cords, as they state. And, certainly, even with intubation, i.e., putting a tube down the patient's mouth for breathing, even with retraction and certainly manipulation of the soft tissue, this recurrent laryngeal nerve can be affected. The vocal cords, in and of themselves, are not directly affected, but it is the...the recurrent laryngeal nerve that innervates, or gives the sensation or the control, if you will, can be affected. That is why it is better to do a blunt dissection with your digits, or your fingers, than it is to do a sharp dissection with a scalpel or...or some other sharp instrument. Excellent question.

00:18:52

STEVEN WEINSHEL, M.D.: Mark, if I may interrupt you?

MARK GARDEN, M.D.: Yes, Sir.

00:18:54

STEVEN WEINSHEL, M.D.: Dr. Ots is sucking the blood out, but there's that white shiny surface there.

MARK GARDEN, M.D.: Oh, that's beautiful.

00:19:00

STEVEN WEINSHEL, M.D.: That's called the dura, which is the lining that covers the spinal cord. So with these very fine instruments I'm reaching underneath the bones and taking out pieces of bone that are pushing into this lady's spinal cord and into the nerves to her arms.

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MARK GARDEN, M.D.: Look how glistening that, what we call the ventral thecal sac, or the [duralux?] and that is a beautiful sight once you get through all the...the bone and certainly the...the disc in...As you come upon that thecal sac, what a beautiful sight that is.

00:19:35

LESLEY BITTERS, R.N.: This looks like a good time for us to go back to more of the PowerPoint.

MARK GARDEN, M.D.: PowerPoint? Absolutely.

00:19:38

LESLEY BITTERS, R.N.: So that we can explain a little bit more about the anatomy of what we're seeing.

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MARK GARDEN, M.D.: Absolutely. Let me just give you a little bit of a description of the discs. The discs are clearly shock absorbers. They help with primarily axial loading. As you try to compress objects, the disc really gives you that ability to re...to refrain, or to keep the compression from occurring. It also is important for segmental motion and certainly is a pivot point for motion. The cervical herniated disc, it compresses multiple things. As we talked about before, the...the pathology occurs once the disc is herniated posteriorly or, i.e., into the ventral or anterior spinal canal. That's where the nerves and then the spinal cord is.

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So the nerves can be compressed and those nerves certainly cause innervation to the arms and as the nerves are compressed, significant pain, weakness, sensory changes, reflex changes can occur. Additionally, and even actually more importantly and more concerning is the fact that the...the herniated disc can cause the spinal cord to be compressed and deviated. This is a different form of neurologic problems. It's called myelopathy, and that...and that does not forebode a good outcome. That's why it's very important to insure that a quick decompression of the spinal cord is performed.

00:21:15

LESLEY BITTERS, R.N.: One of the viewers asked, as that disc is being taken out, just how much disc are we taking out?

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MARK GARDEN, M.D.: Well, the...the disc in total is being taken out. That is what's...this anterior approach is being...is being done for, actually. Even though the...the disc may not totally be herniated – meaning you may have a small portion of a disc that's herniated out, the disc in toto is being removed to insure virtually that this doesn't happen again at this level.

How are things going guys?

00:21:51

STEVEN WEINSHEL, M.D.: Things are going very well.

MARK GARDEN, M.D.: It looks like you had the bleeding under control there and that ventral thecal sac looks great.

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STEVEN WEINSHEL, M.D.: We had a little bleeding, but we got it stopped and pretty soon I'm gonna be done with this part and I'll tell you...What I'd like to show the listeners, or the viewers, is I now have a little device that you can see in the microscope, and I'm gonna reach actually underneath the bones of the spine to make sure that there's nothing pushing on the spinal cord above where I've worked. And I'm gonna do the same thing on the bottom here and make sure there's nothing pushing on the spinal cord there. And my instrument goes in that space very freely without any problems.

00:22:37

LESLEY BITTERS, R.N.: That really goes back, I think, to that earlier viewers question about doing it through an...an endoscope, so to speak. How important it is to...for the surgeon to be able to feel if there's any further compression or if he's gotten out enough of the disc and there's no retained fragments that are likely to prevent the patient from getting the pain relief.

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MARK GARDEN, M.D.: That's correct. Let me just make one point. Again, remember what we talked about at the beginning of the...of the show here is that this is an anterior cervical decompression and grafting. The decompression procedure at this point is being undertaken and, in my opinion, is the...is the most important. There's still several steps to be performed, but you can see the meticulous attention to detail that is needed in order to

decompress not only the nerves, but also the spinal cord and to insure that we do not have any injury to the vessels, including the vertebral artery. Thank you Rooney.

Shall we go to the PowerPoint again, or do you have another question?

00:23:41

LESLEY BITTERS, R.N.: I think when we go back to the PowerPoint – and I'm not sure that we've had a chance to talk about this up to this point, but I think it would be helpful to let some of our viewers know what kinds of things we can do for these patients before they come to the operating room. How do we really try to keep people from having surgery, if we can.

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MARK GARDEN, M.D.: Yes. Great points, Lesley. I think it should be noted first and foremost we treat patients and not x-rays. Many times we see patients come in with bad x-rays but neurologically they're okay. Other times we see patients in the office who have bad x-rays and are bad neurologically. Obviously, those are...are patients that we must...we must take care of urgently.

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But, I agree with Lesley, we have non-surgical intervention associated with...with our patients. Unless myelopathy is present, unless that severe spinal cord signs or symptoms, or they have...unless they have motor dysfunction – meaning foot drop or upper extremity weakness – we do multiple non-surgical care options. One is physical therapy. And one of the neat things about physical therapy is that we can have the therapist, over time, and repeatedly two to three times a week over several weeks help us, as the clinician, determine the strength of the patient's arms, in this case for example, their sensory changes and also their ability to mobilize their upper extremities and determine what they're able to lift and move.

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Another option with physical therapy is what's called cervical distraction. If you all can think about it, our heads are a weight on our...on our spine, on our neck. If we can somehow distract our neck off...off...distract our head off our neck, that allows our ability then to open the foramen and cause a distract in it...a distraction issue, so these nerves are no longer compressed. And that's a very helpful...helpful addition, but unfortunately after the distraction is done you still settle down and that can still cause neurologic problems.

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STEVEN WEINSHEL, M.D.: Mark, if may interrupt.

MARK GARDEN, M.D.: Yes, Sir.

00:25:55

STEVEN WEINSHEL, M.D.: Dr. Ots and I are convinced here that the spinal cord and the nerves are free, but now as you see there's a hole where the disc used to be. We need to fill that hole with some device so that these bones don't collapse and pinch the nerves. So now we are going to attempt to figure out what size devices we're gonna put in there. Now we have a choice of different devices. We can use hip from the woman's...from her own...We can use bone from her own hip. We can use bone from a dead person who's donated bone pieces or, in the case of this woman, she wants to use a plastic device made up of a substance called [Peek?]. So we are going to put these spacers in here to see what size we need. Can I see a 7, please.

00:26:42

LESLEY BITTERS, R.N.: You know, that's interesting, Steve, that you bring it up at this point. I was just handed a question one of our viewers was asking how we make that decision as to what type of grafting material we want to place. And, actually, I think we have some models here---

MARK GARDEN, M.D.: Yes. Absolutely.

LESLEY BITTERS, R.N.: ---that we can use to show bone and the [Peek?] that you're looking to use for this case.

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MARK GARDEN, M.D.: It should be noted that the discussion is made in a pre-clinic...a preoperative clinic visit with the patient. And what we can do is we discuss the ability to take it from her hip, which is a painful donor site and that in and of itself is morbidity. This is...This is the [Peek?] construct that Dr. Weinshel was talking about. It's virtually a plastic, a hard yet pliable material and you can see a hole. I'm just gonna try to put my little digit in there, my pinky, if you will, and that hole then is filled with a...either autograft localized from the patient's vertebral bodies that's scraped or an allograft material, which is a non-patient material. And then this is filled, the hole is filled with a type of either allograft or autograft and then this construct collectively is impacted gently into the disc space to help keep that...that neural foramen open and also to give what's called a arthrodesis, or a grafting.

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STEVEN WEINSHEL, M.D.: Mark, if I may interrupt?

MARK GARDEN, M.D.: Absolutely.

00:28:08

STEVEN WEINSHEL, M.D.: I'm gonna show the device that we're gonna put in this woman's neck. This is the plastic device that we're gonna use. Can you see that well? And what we're gonna do with this is we're gonna fill this with a little pellet which is actually bone, human-like bone, made in a factory. And we're gonna fill this device with this...with this human bone substitute and this is going to eventually grow into her spine and prevent these bones from collapsing and pinching the nerves again.

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MARK GARDEN, M.D.: That's neat. And, again, it's that inner material that will incorporate into the end plates of the vertebral body and grow. The plastic material is kind of that spacer material maintains the disc space height so that this doesn't collapse. If indeed this collapsed again, for example if the spacer is not in, the patient can once again have symptoms associated with nerve recompression. And as I stated before at the beginning, we have several stages for this operation and this becomes stage two, as far as the...the grafting.

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STEVEN WEINSHEL, M.D.: So, Mark, before I put that plastic piece in, I'm gonna feel around here one more time with my curette and make sure that the...nothing is being compressed. Now I also want to show that actually we never see the spinal cord. The spinal cord is actually right behind this shiny white tissue, so we actually never do see the spinal cord. And that white tissue is there to protect the spinal cord and to keep the spinal fluid in place. Now what I'm about to do is I'm about to insert this...this plastic device and...you can see on the microscope that this plastic device is going in. And it seems to go in very nicely.

MARK GARDEN, M.D.: Excellent.

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STEVEN WEINSHEL, M.D.: I'm gonna remove this instrument and then Dr. Ots is gonna relieve the...the pressure on the bones. And we're gonna test this and we're gonna see that this plastic spacer device is in there quite snugly.

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LESLEY BITTERS, R.N.: Steve, as you've done that, one of our viewers has asked about what we do to protect the dura and how strong the dura is, and what we do to make sure

that we haven't damaged the spinal cord in any way during this procedure. Could you address that question?

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STEVEN WEINSHEL, M.D.: Well, I think the most important thing – bone wax – is to use the microscope and get very good magnification and very good visualization, and use very fine instruments. And that's how we prevent spinal cord damage. The lining of the spinal cord is actually quite tough, but it is...it would not be...It's not impossible to put a hole in it.

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MARK GARDEN, M.D.: And as...And as Dr. Weinshel is putting a little wax in the holes where the distractors were, you can see that now we...he, or we collectively, have finished the second part of the operation; not on the decompression initially, but then the grafting and the spacer. The next will be putting a...an anterior cervical plate to keep this all aligned and maintained.

00:31:38

LESLEY BITTERS, R.N.: And as Steve gets ready for that plate, we've just gotten several questions asking about the recovery for this. How long this patient will likely be in the hospital, and a few others that I'd like to follow-up with after that.

00:31:50

MARK GARDEN, M.D.: Well, that...those are great questions and with firm conviction at this facility at Aurora BayCare Medical Center, we commonly send these patients home the same day. As you can see that the operation is going very successfully without...without complications. These patients will be monitored in the postoperative recovery room for several hours to insure that there aren't any morbidity...morbidity problems, including bleeding, infection, swallowing difficulties. But these patients will be discharged in a matter of several hours to home where they can sleep in their own beds, where they can use their own restrooms, drink their coffee and...and really, theoretically...potentially, within the next twenty-four to seventy-two hours return to work in a relatively non-labor-ous fashion, but certainly desk jobs and on computers, etcetera.

00:32:48

LESLEY BITTERS, R.N.: One viewer asks if there was a lot of pain or swelling after the procedure. I can say that from my own experience there's certainly some difficulty with swallowing. I shouldn't even say difficulty, but it kind of feels like you have a sore throat. I found popsicles very soothing and, fortunately, my husband ran out and got several of them for me that first day. But in terms of swelling of my neck, and things like that, that's not something that I've found or that I've seen in these patients either.

00:33:13

MARK GARDEN, M.D.: And that's, again, the dissection, the planes of dissection are relatively bloodless. The planes of dissection are relatively painless. Obviously, di...making an incision in someone's neck, albeit it may be only 3 centimeters in a...in a transverse area, dissecting the muscle tissue is a little bit painful. But, really, what's amazing is that the...the pain intensity is relatively low compared to multiple other procedures that we do.

00:33:45

LESLEY BITTERS, R.N.: And the pain that—

STEVEN WEINSHEL, M.D.: Mark?

MARK GARDEN, M.D.: Yes, Sir.

00:33:46

STEVEN WEINSHEL, M.D.: Oh, excuse me, both of you.

MARK GARDEN, M.D.: Yes, go ahead.

00:33:48

STEVEN WEINSHEL, M.D.: I'd like to show what a cervical plate looks like. This is a device that's made out of a metal called titanium. And what we're gonna do with this device is we're gonna screw this into the sixth and seventh bones in the spine. What this does is it keeps that graft in place. In the old days when...before we used these plates, the patient would need to wear a neck brace for sometimes up to two or three months and it was quite uncomfortable for patients. So we're gonna put this little plate in there. Totally made out of titanium. It's not a magnetic metal. They can go through the airport metal detectors. We've got that asked all the time.

MARK GARDEN, M.D.: Yes.

00:34:26

STEVEN WEINSHEL, M.D.: But we're gonna put this little metal plate in there and it provides instant stability to the spine.

00:34:32

MARK GARDEN, M.D.: The procedure, again, is that the plate then is just virtually screwed into the vertebral bodies; in this case that's C5 and C6. Allow me to do that. And then, certainly, two screws are put into each segment. And Dr. Weinschel will certainly demonstrate that interoperatively at the C5, 6 level. There you go.

00:35:00

LESLEY BITTERS, R.N.: I think we've seen that this is a fairly common condition. In fact, several of our viewers have written in with questions about their own experience. And some patients have had this before and now are experiencing arm pain again, wondering if this operation can be done a second time for them.

00:35:17

MARK GARDEN, M.D.: Well, there...again, it certainly can, but the mechanism of injury or compression is a little different. There may be what's called a false fusion or a pseudoarthrosis at this level. But, certainly, it could be the level above the...the level of the fused segment that is giving a problem. The fact is though, however, that a herniated disc at this same level is very, very rare, simply because there isn't much more disc there to herniated out. But, there could be collapse of the construct, and that needs to be worked up not only from an examination standpoint, but radiographically.

00:35:58

STEVEN WEINSHEL, M.D.: Now, you can see in the microscope we are putting that plate in place.

00:36:08

LESLEY BITTERS, R.N.: To this point we've really...we've talked about the fusion. Now we're talking about how the plate adds stability so patients don't need to wear a collar, and can get up and go home and return to at least sedentary activities very quickly. Another viewer has written in asking about disc replacement, which I know has become a very popular topic.

00:36:26

MARK GARDEN, M.D.: Yes, and we're excited about that here at Aurora BayCare Medical Center. In fact, in several months we will be performing some type of an experimental artificial disc placement. Several of the neurosurgeons are involved with that. And, really, that's a... that's a very, very exciting procedure that will be in the forefront in years to come. The fact of the matter is, and I think all the neurosurgeons and spine surgeons agree is, with a cervical herniated disc many times you really don't have to do the fusion as the...as the primary procedure.

00:37:04

But, in order to get the disc out, you have to remove the...a lot of the mechanical stability segments of the spine. And in doing that, it's...it's incumbent upon us then to reestablish stability and the best way to do it is to place this graft which maintains the disc space and

the disc space height. And, also, the windows through which the nerves are going are open, and then to stabilize it also with a plate. So---

00:37:29

STEVEN WEINSHEL, M.D.: Mark, if I could interrupt?

MARK GARDEN, M.D.: Yes.

00:37:31

STEVEN WEINSHEL, M.D.: We've now...We now have three of the screws in place. We are just tightening them down. And Dr. Ots is about to put the fourth screw in.

00:37:43

LESLEY BITTERS, R.N.: Steve, as Dr. Ots does that, one of our viewer questions...the viewer has asked if you're able to identify any other levels of the spine, or perhaps adjacent levels for any disc problems during this operation?

00:37:57

STEVEN WEINSHEL, M.D.: I'm actually not. And it would be nice if we could, but that...[go?] handle...One of the nice things about this operation and why people can go home is because we use such a small incision and it is so...it's so...so little trauma to the spine. Plus, to find more of the spine we would have to really expose more of the spine and it would be much more traumatic for the patient.

00:38:21

LESLEY BITTERS, R.N.: We've also had a lot of questions asking about the relationship between the lumbar spine and the low back and the cervical spine problem, and this fusion being done to treat that and if a fusion is a good help for a low back condition.

00:38:37

MARK GARDEN, M.D.: It certainly...Fusion is certainly done in the lumbar spine. But if we can look at this as a...as an analogy, we're comparing a little bit of apples and oranges. In the lumbar spine, discs do herniate. The good thing about - if I can say good - about the lumbar spine is that the canal is capacious. It's wide, it's...it's not as tight as the cervical spine, nor is there the cord in the lumbar spine. The spinal cord actually stops at about T12 and L1, and then you have what's called these...they're called the equino or the horse's tail, that then emanate out into these little nerve roots. The discs that herniate compressing nerve root, and they won't necess...they won't by definition compress the spinal cord.

00:39:21

STEVEN WEINSHEL, M.D.: Mark, if I can interrupt again.

MARK GARDEN, M.D.: Yes.

00:39:23

STEVEN WEINSHEL, M.D.: We have the plate, the four screws in place. And I think you can see that in the microscope. The plastic graft is in the middle there, nice and solid. Now we're gonna take the microscope out and we're gonna get an x-ray. And we're gonna make sure that everything is in good position.

00:39:38

MARK GARDEN, M.D.: Beautiful. Now do you leave the retractors in, Dr. Weinshel...at this point?

00:39:43

STEVEN WEINSHEL, M.D.: I'm gonna leave them in until we get the x-ray.

00:39:45

MARK GARDEN, M.D.: Excellent. Excellent. And as one can see, verifying intraoperatively with radiographs is vital, not only to see the positioning of the plate but to insure that...that any foreign materials aren't left in, and things, so it's very...it's done often. Virtually every time, if not every time and it's very helpful.

00:40:06

LESLEY BITTERS, R.N.: Steve, while the x-ray technologist is moving their equipment into place, I've got a couple of questions that I think our viewers would like to ask of you. One of which was wondering about the sizes of the grafts that you put in. How you determine that?

00:40:23

STEVEN WEINSHEL, M.D.: Well, the grafts come in various sizes, from 4 millimeters all the way up to 10, 12, 14 millimeters. We put the size in at slightly larger than the hole because we like to spread the bones apart a little bit and then use the tension of the bones to hold the piece in place. It also...But, at the same time, we could put too big a piece in, so we just have to size things carefully and make sure that we get the right size.

00:40:54

MARK GARDEN, M.D.: And as we can see at this point, the x-rays under fluoroscopy are being performed. And it will be a lateral C-spine x-ray to determine the placement not only of the graft, but also of the...of the plate and the...and the screws. If I may---

00:41:11

STEVEN WEINSHEL, M.D.: And I'm gonna walk over and look at the x-ray.

00:41:14

MARK GARDEN, M.D.: Excellent. That looks great, Steve.

00:41:22

STEVEN WEINSHEL, M.D.: Now what we have here is we have the sixth bone with two screws in it, the fifth bone with two screws in it and the metal plate holding everything together. The plastic device that I put in place there has these little small metallic markers to show up on x-ray. So here is what we did today. This is what she had done about three months ago, so now she has both the fifth and sixth bone fused together and the metal plate holding everything together. It will be many months before her own bone forms in there to really hold that together strongly. But in the meantime, that metal plate is strong enough to hold everything together.

00:42:03

LESLEY BITTERS, R.N.: Steve, are there any healing differences, depending on what type of graft material you placed between those vertebrae?

00:42:09

STEVEN WEINSHEL, M.D.: Well, that's...A lot of that's up to the neurosurgeon's preference. The...When you put a piece of bone in there instead of plastic, the body tries to destroy that bone. At the same time, the body tries to grow new bone through that area. What's nice about the plastic device is that the body doesn't destroy it and it allows more time for the body...for the bones to fuse together.

00:42:34

LESLEY BITTERS, R.N.: And with that plate over that now to essentially hold that still while she fuses, she won't need to wear a collar?

00:42:40

STEVEN WEINSHEL, M.D.: I do not put my patients in a collar when I use that metal plate.

00:42:53

MARK GARDEN, M.D.: It should be...If I may take this opportunity with a little lull, this program will be archived for twenty-four hours a day once this...once this program's over, so that's...that's kind of exciting for all of us to review....

00:43:08

LESLEY BITTERS, R.N.: We've gotten some e-mail notes in from folks asking if there would be similar webcasts, and even some students who think that this is helpful to them. Some surgical technologist students who will be doing what Amy does in the future. So I think that's kind of neat that we've had that opportunity.

00:43:23

We've had a couple more questions about the recovery period in general. You know, not just being out of the facility, but going back to work and doing that kind of thing. Can you address those with me?

00:43:35

MARK GARDEN, M.D.: Oh, I'd love to. And I think this is the...this is the exciting part of this procedure. Not only do the patients do well from a...from a surgical standpoint – meaning that the operation goes very, very well. Minimum morbidity. But they are now able to go back home and en...begin to enjoy their normal activities of daily living without...without undue stressors. For example, I'll have my patients be able to drive in a matter of three to five days. They may bath and swim and go up and down stairs. We certainly don't want to immerse them in the water, but certainly they can get this area wet. Lifting is still an issue, simply because their strength of the arms, their strength of the muscle groups that...that...of the arms, for example, are still affected.

00:44:26

Even though the nerves are decompressed, the...the muscle memory still need...legs behind the decompression. So lifting still...lifting restrictions are still...are still in place. But these patients are excited to start beginning their normal activities.

00:44:42

STEVEN WEINSHEL, M.D.: Okay, Mark, if I may interrupt?

MARK GARDEN, M.D.: Yes, Sir.

00:44:44

STEVEN WEINSHEL, M.D.: What Dr. Ots and I are doing now is just washing out the...the wound. Making sure that we get everything nice and clean. And making sure there is not any bleeding in here that would make her postoperative care more complicated.

00:45:02

MARK GARDEN, M.D.: Excellent diligence. And I think it's that fact that...we use the word Valsalva, or that we stress the soft tissue a little bit and we watch any bleeding points. And, certainly, that is one of the morbidities postoperatively that we want to eliminate.

00:45:18

LESLEY BITTERS, R.N.: Another viewer has asked, how common is this procedure and how many of these types of surgeries are done typically in a facility such as this over a years time?

00:45:27

MARK GARDEN, M.D.: Yes. We...We at BayCare...at Aurora BayCare Medical Center, with the five neurosurgeons, we do approximately four hundred of these anterior cervical decompressions and grafting. Now, we do approximately fourteen hundred plus spine operations, but we do about four hundred or so, Lesley wouldn't you think, about the...the anterior cervical procedures? What's great with this is that over sixty percent...sixty percent plus really go home the same day. And I think that that is an exciting advancement in the procedure. The fact that we wish for patients to be active with minimal morbidity, returning to work, playing with their children, all is very exciting for us as the treating physicians.

00:46:19

LESLEY BITTERS, R.N.: We...Also, I think it would be just kind of interesting to mention at this point, in addition to doing, you know, four hundred of these at this facility, we also do them at facilities in the region too.

00:46:30

MARK GARDEN, M.D.: Yes. And that's a great...that's a great comment. It should be noted that we do outreach at multiple places across the area – in Northeastern Wisconsin, even into Oshkosh and certainly into Michigan. What's exciting is that we are able to do this procedure at the patient's...at the patient's hometown virtually. We go to those proced...we go to those facilities, such as for example, Two Rivers in Marinette and Oshkosh, and we're able to perform those procedures as an outpatient. The patients no longer have to come to

Green Bay to have these procedures performed. It's exciting for the patient and the family, so that the patient can...can stay at their home, can do the things that they wish to do in a routine fashion.

00:47:21

STEVEN WEINSHEL, M.D.: Mark, if I may also interrupt one more time. There's a very important person in the room that's here for the safety of the patient; taking care of the patient during this entire operation, and that's the anesthesiologist. And today we have Dr. Steve Brada with us.

00:47:38

MARK GARDEN, M.D.: Excellent. That's a...It really is a team effort. That's...That should be...That should go without saying. Many times...Many times we forget about the people around us when we're doing the procedures, but what a team effort and that's exciting for the patient. Patient care is number one and we want to promote that unequivocally.

00:48:01

STEVEN WEINSHEL, M.D.: At the moment, I'm sewing the very...the very thin muscle layer together in her neck that's right underneath the skin. And then all we...Then we close we the skin and then we're done with the operation.

00:48:14

LESLEY BITTERS, R.N.: Well, that means we've got time for a couple of questions yet then while you're closing things up there, I hope. A couple of people have wondered what makes you... or, helps you make the determinations as to whether a disc should be removed from the front of the spine or from the back?

00:48:31

MARK GARDEN, M.D.: That's...That could be position preference. Many times, if there's architectural changes of the anterior column of the spine. In this case, disc space collapse. In this case, osteophytic involvement, which is what's called ventral thecal sac compression or the spinal cord being involved, and the nerves or the windows through which the nerves are being compressed, the anterior approach is the...is the way to go.

00:48:56

However, if indeed the patient has simply radiculopathy or a single nerve root involvement with, in this case, an arm in...a portion of the arm being numb or weak and there's a soft disc that is protruding laterally, far enough laterally through the window, doing a posterior cervical foraminotomy is a reasonable approach. And I know Dr. Ots is a technical whiz at those. He's done a...He's done many of those and with very good success.

00:49:28

LESLEY BITTERS, R.N.: Could you talk a little bit more about the cervical plate? Some viewers are wondering when you put those screws into the bone, does that compromise the structural integrity of the bone and how long that plate stays in there?

00:49:40

MARK GARDEN, M.D.: A couple...A couple of answer to that. The plate...The plate may stay in there for infinitum. I mean, as...if we...Steven, if we did a thousand of these procedures, how many times have you taken this... the cervical plate off?

00:49:57

STEVEN WEINSHEL, M.D.: Oh, probably...a couple out of every hundred that we do.

00:50:01

MARK GARDEN, M.D.: Right. So it's just a...It's just something that if the...if...once this area is fused, which is about twelve to sixteen weeks, taking the plate off is...is a reasonable thing to do. But, the question we raise is, why do it with potential inherent more morbidity when it's not necessary? And then the other question, I'm sorry, was about the plate?

00:50:26

LESLEY BITTERS, R.N.: If there's any structural change or risk to the vertebral bodies when those screws are placed to anchor that plate?

00:50:33

MARK GARDEN, M.D.: Well, certainly...certainly, if there was a traumatic event occurring in a motor vehicle accident, this is susceptible. But so are the levels above and below the level of the fusion. The...The cervical plate, however, in and of itself, it's so tightly along the contour of the anterior vertebral body that...that really is becoming a moot point, as far as structural changes or adverse changes to the spine.

00:51:01

LESLEY BITTERS, R.N.: Someone else has asked about the complications of the procedure, or the risks of the procedure, and one thing that I think is...would be helpful for viewers to understand is that one of the biggest risks of the procedure – and it's not a big one, but it is one of the things that we have to think about – is there sometimes is a failure of the pain to be relieved. And then that's probably the biggest risk, although it's not a big one. We can take the pressure off of the nerve root. We can put that graft in there to maintain the spacing. We can put a plate onto maintain that stability. But how well that nerve heals is really up to that patient's physiology. And in terms of other complications, I think they're pretty rare.

00:51:37

MARK GARDEN, M.D.: Yes, they are. The...The...Unfortunately, the nerve is unforgiving. Once the nerve is compressed, there's multiple physiologic changes that are occurring on the nerve with resultant pathology down the arm, for example. Even if the compression is removed, the nerve still feels its pain, if you will. The way I quote it is, a millimeter day that nerve somewhat, quote/unquote "regenerates" to allow the healing process. That's the expectations I give to my patients. So one can imagine there are hundreds of millimeters from the neck down into the digits, or fingers, and it takes that long for that nerve to forget its pain and to no longer remember the problem.

00:52:26

Other complications are clearly evident – bleeding, infection, injury to a nerve. The risk of anesthesia is not...is not small. The risk of what's called the vocal cord or recurrent laryngeal nerve involvement. But collectively...collectively, when someone comes in with neurologics [00:52:46equality?], the risk of non-surgical care is higher than the risk of surgical intervention, unequivocally.

00:52:52

LESLEY BITTERS, R.N.: And the long term success rates of this? The percentage of patients that are happy and get good relief and return to full and productive lives?

00:53:01

MARK GARDEN, M.D.: Oh, I think...I think this case...this operation is an excellent operation for relief of symptomatology so patients can return to an active life. I would quote anywhere from ninety percent, ninety-five percent up. It's just a...It's an exciting operation.

00:53:16

LESLEY BITTERS, R.N.: Is there much loss of range of motion that patients perceive? Now, with a single level fusion on my own, I don't perceive that, but as you fuse two or three levels for some patients?

00:53:26

MARK GARDEN, M.D.: Well, I...I have to tell you a couple of anecdotes, but I will...I will elaborate. Really, unless you're a gymnast, a single level arthrodesis, or fusion, is not going to cause substantial diminished range of motion. I actually had a high school wrestler, who actually was in the state meets this year and he wrestled for the high school. So you can see that increased activities are still allowed with a fusion. But, clearly, several levels of fusion, that does pose a problem. And I don't want anyone to think that their...their spine becomes so rigid that they cannot move, but clearly if they're asking to do aerobic

activities, you know, diving in a pool or doing somersaults, that is something that...that is forbidden and certainly would not... would not be wise.

00:54:25

LESLEY BITTERS, R.N.: Do patients need...My experience is most generally don't need a physical therapy course after the procedure, but one of our viewers is wondering how important or how frequent physical therapy is in a recovery for this patient?

00:54:37

MARK GARDEN, M.D.: I think physical therapy is important. When I talk to my patients – and I know Dr. Weinshel and my associates talk to their patients about a postoperative therapies. Again, the postoperative morbidity or continued problems are absolutely related to the preoperative problems. If someone comes in with severe neurologic problems, including nerve compression, motor weakness, they are going to need some type of physical therapy postoperatively. Not only does that help them with range of motion and strengthening, but it also gives them encouragement from someone else who is able to follow them periodically and consistently through a week. And also camaraderie, and I think that's...that's vital.

00:55:20

LESLEY BITTERS, R.N.: Steve, do you have any final thoughts as we're finishing up this patient's procedure about the procedure, the future of the technology and recovery for this gal, in particular?

00:55:30

STEVEN WEINSHEL, M.D.: Well, I just want to make sure everybody realizes how smoothly this operation went, how quickly it went, how little trauma we did to her neck. And it's very pleasing to know that ninety percent chance that this lady is gonna wake up and have very good relief of her arm pain, and be able to get back to work, probably within a few weeks.

00:55:50

LESLEY BITTERS, R.N.: She does fairly heavy work, as I recall.

00:55:51

STEVEN WEINSHEL, M.D.: She does fairly heavy work, yes.

00:55:55

MARK GARDEN, M.D.: Well, as you can see, this was a significant success. Dr. Weinshel and Dr. Ots, and all the colleagues, did a wonderful job. I would just like to thank you all for joining us. It is so exciting to be...have been part of this. It's so exciting to have you come into our operating room suite and for us to share these moments with you. Thanks again, and what a wonderful time this has all been for...for everyone involved. God bless you and God bless America.

00:56:30

NARRATOR: This has been an anterior cervical fusion performed live at Aurora BayCare Medical Center in Green Bay, Wisconsin. To obtain more information or to make an appointment, or make a referral, please click on the button on your screen.

00:57:03

[END OF WEBCAST.]