Speaker 1:

Welcome to Optimal neuro|spine Podcast, a podcast about optimizing our brain and spine in health and disease. Each episode, leading neuroscientists, neurosurgeons, educators, patients, spine care, and quality improvement experts discuss their research, experience, emerging science, surgical advances, and insights about how to optimize neurological and spine care. Now, here's your host, Dr. Max Boakye.

Dr. Max Boakye:

Welcome to the Optimal neuro|spine Podcast. Today, I have a highly distinguished guest. He needs no introduction. I'll be speaking with Dr. Edward Benzel. Ed Benzel as everyone calls him. He is a giant in the world of spine surgery. Dr. Benzel is a neurosurgeon and former chairman of the Department of Neurosurgery at Cleveland Clinic. He served as medical core director of the Cleveland Clinic Foundation, Spine Research Laboratory, and course director of the annual Cleveland Spine Review: Hands-On course. He has been actively involved in numerous organizations, including the Congress of Neurological Surgeons, American Association of Neurological Surgeons, North American Spine Society and Cervical Spine Research Society. He's editor-in-chief of World Neurosurgery and was founder of the World Spinal Column Society, and he's a founding member of the Lumbar Spine Research Society. He served as co-chairman of the editorial review board of the Journal of Neurosurgery and chairman of the review board for the Journal of Neurosurgery Spine.

Dr. Max Boakye:

He holds 17 US patents. Dr. Benzel is a prolific author of scientific research. He has edited over 30 books and written over 370 book chapters. He's author of seminal textbooks, including the Biomechanics of Spine Stabilization, which is now in the third edition and Spine Surgery Techniques, Complications, Avoidance and Management, which is also in the third edition. In addition to his publishing and editorial accomplishments, Dr. Benzel is widely sought after and is frequently invited as a visiting professor, speaker and instructor at hospitals, universities, and major medical meetings. It's definitely not an understatement to say that he's probably the most knowledgeable spine surgeon in the world. Dr. Benzel, welcome.

Dr. Edward Benzel:

Well, thank you for having me.

Dr. Max Boakye:

You are one of the most famous and recognizable spine surgeons in the world and have written some of the most seminal books and articles and given presentations at top national meetings and are much sought after speaker. It's really quite a privilege to be speaking with you today. I wanted to use this interview to get some reflections on your experiences in spine surgery. Some lessons learned, including your evolution as a spine surgeon, your decision making, especially in difficult cases, your development as a spine surgeon, safety in spine surgery, your thoughts where the field is headed and about molding technologies and evidence gaps, and also a little bit about information about how you manage certain practical situations that would be of interest to young surgeons. Let me start with your personal experiences and reflections. What is your current clinical practice like?

Dr. Edward Benzel:

Well, I'm 73 and on January 1st of this year, I went to 80% time and I'm going to spend more time with my wife and take off first week of every month and travel, work around the house, et cetera. I backed off a little bit clinically and I really have backed away from degenerative lumbar spine and moved forward into doing much more spine tumor surgery, particularly intradural, extramedullary, intramedullary tumors. I'm focusing more on education. As you mentioned, I'm the editor-in-chief of World Neurosurgery, which occupies a huge hunk of my time. It is very rewarding for me to put this together for neurosurgeons all over the world to enhance their acquisition of neurosurgery content, but perhaps the most meaningful thing I do is mentor. I mentor people, resident students, faculty members both at the Cleveland Clinic and nationally and internationally, and I immensely enjoy that.

Dr. Max Boakye:

Why did you pick spine surgery? What has been the most rewarding aspects of spine surgery career?

Dr. Edward Benzel:

Well, I trained in a program at Medical College of Wisconsin under the tutelage of Sanford Larson, who was arguably the first and foremost neurosurgery spine surgeon. In other words, he dedicated his career to spine surgery. It was hard to be a resident in that program and not be focused on spine. For that, I am very grateful. As far as the most rewarding aspect of my career, again, I think it's just been one thing leading to another and the transformation from a rookie finishing his neurosurgery training to a person who was able to come up with some unique ideas and strategies and to build on that, again, probably the most rewarding aspect as I stated earlier, is the opportunity that has been afforded me by all of this to mentor other surgeons.

Dr. Max Boakye:

Every spine surgeon wants to be the very best surgeon they can be. How did you evolve as a spine surgeon? What are some of the most important things you did to improve? Did you reach your peak early and did you continue to improve well into your 50s and 60s? You mentioned you were 73. Do you think you're still improving your surgical skills?

Dr. Edward Benzel:

I put much more emphasis on the decision than the incision. By that, I mean, I truly do not consider myself a master surgeon, but I do consider myself a person who makes good judgements and tries to really find the truth as to what procedure or non-procedure would best manage a patient. As far as my psychomotor skills, I'm guessing they're falling off a little bit, but just like a veteran quarterback in football, the legs may not be as strong. Maybe he can't throw the football as far, but judgment improves with age. I think that has been the case with me. I would say I was at my peak from a psychomotor skill perspective five or six years ago, but I don't think that it's fallen off that much, but I do feel that my decision making ability and maturity has increased and is continuing to increase.

Dr. Max Boakye:

How did you continue to increase that? Is this something that naturally comes with age or are there some particular things that you did in order to allow it to blossom with time?

Dr. Edward Benzel:

You mean my...

Dr. Max Boakye:

Cognitive skills. Your decision making.

Dr. Edward Benzel:

Yeah. Yeah. Well practice, practice, practice, and being honest with yourself, using some heuristics. Heuristics are like rules of thumb. If you do a disc operation and a patient's leg pain goes away, you could take credit for that, but non-operative management is often effective for the same problem, or also understanding that with every outcome from surgery, there's some good parts and bad parts, and only seeing the good parts of a postoperative course of a patient you operated on causes you to be blinded to the fact that sometimes the patient has problems that are related to your surgery.

Dr. Edward Benzel:

For example, I, several years ago, did a laminectomy infusion for a patient with cervical spondylotic myelopathy. I tried my best, but did not get her back into a fully normal lordotic position. Although her myelopathy improved significantly, she had a chronic neck pain problem related to a straightened spine and a stiff spine. I think that when I was younger, I would look at that and say, "Well, she's better myelopathically and just forget about the rest," but that kind of stuff bothers me now. I try to focus on what went wrong in spite of the fact that a lot of things went right with any given case or any given decision making process.

Dr. Max Boakye:

That is very interesting. You did bring up Tom Brady.

Dr. Edward Benzel:

Well, I didn't bring up Tom Brady. I brought up a veteran quarterback.

Dr. Max Boakye:

Okay.

Dr. Edward Benzel:

We can talk about Tom Brady, if you like.

Dr. Max Boakye:

Well, there's always a question of, was it the coaches or the quarterback. Right? The same is applicable for surgeons. Did you take time to go watch other surgeons and get coaching from others during your development? In that regard, who are your coaches or mentors?

Dr. Edward Benzel:

Well, I still will occasionally drop into the operating room and see how others do things. For example, also when doing an intramedullary spinal cord tumor, one of my partners and myself have an agreement to work on the intraoperative decision making process together because that's a lonely place to be when the evoked potentials are going down, and you're trying to take out a tumor and you literally have the patient's life in your hands and the patients depending on the decisions that you make. I think it's

important to understand from others, but I don't. Other than those types of things, I haven't really taken upon myself to spend a week with somebody or something similar to that.

Dr. Max Boakye:

Were there mentors, people that you looked up to or pick up a phone and call or spend a regular time with them, monthly phone calls? Were there anything like that, or...

Dr. Edward Benzel:

I laugh because the answer is no. I think a lot of people do that, but from the time I graduated from my residency, I, for a short period, had a partner who was older than me. After that, essentially my entire career, I have not had a spine partner that was older than me. If I look back to a mentor as my chairman, Sanford Larson, but I left him back in Milwaukee when I took off to Louisiana to start my career.

Dr. Max Boakye:

You mentioned that you've grown in your judgment and decision making. Right now, how do you make decisions? How do you get the decision right? I think I have an idea of what your answer might be, but I want to hear what are some pearls that you would give to young decisions about how they should hone disability and go about and eventually get decisions right?

Dr. Edward Benzel:

Well, I talked about the heuristics. I try to think about what can go wrong with different approaches, but when it comes down to actual decision making, I just think one needs to be honest with him or herself and not over or underestimate surgical skills and carefully evaluating patients, particularly with degenerative spinal disorders and meticulously dissecting out the patients that have chronic pain syndromes and are unlikely to respond to any surgical procedure, whether it be decompression or a fusion operation. I just think it needs to be a careful process. Believe me, I didn't start this way. When I was young, I remember seeing an image and saying, "Well, I'm going to operate on this image," not necessarily the patient. There's an old adage that I think really holds true here. That is the more I do, the less I do. The more conservative I become and I think this is true for most surgeons and the more careful we become in the decision making process.

Dr. Max Boakye:

Wow. That's great. How do you prepare for difficult cases? Do you often or do you rarely seek the opinion of others? Do you call the patients the day before, or what do you typically do the night before a really tough case?

Dr. Edward Benzel:

I don't call the patient the day before. I usually get the consent a week before, and I go over a lot of things, particularly the things that can go wrong, and I want them to get the blinders off and to understand that. I operate with residents. I talk with the residents or fellows before the case. Usually, the night before I will seek advice. Again, I'm seeking the advice of younger colleagues and oftentimes people who I trained, but interesting thing in that regard is that the people you trained kept learning after you quit training them. They're gathering wisdom as well. One of the things that I feel really strongly about is to get a good night's sleep, particularly if it's going to be a tough case the next day, and I try to go to bed early. I think that helps me have a clearer mind the next day to optimize decision

making, and that's about it. I just try to get ready for the operation, like I guess a football player would get ready for a football game.

Dr. Max Boakye:

What's motivated you to become so productive and writes over 30 books and stay relevant in the field?

Dr. Edward Benzel:

I don't know. Some of it is just, I guess the overachiever part of me, because a lot of it was insane at the time. I'm raising a family, spending a lot of time at the hospital, but the motivation was to try to become the best. I'd like to think a hunger for knowledge. In my first year or two, I pulled together... I got a laboratory technician. We did some spinal cord injury and vascular experiments on rodents. I was at LSU in Shreveport and at the time, there were no neurosurgery residents, but I enlisted orthopedic surgery, general surgery residents. I did all sorts of operations, including EC-IC bypasses, carotid endarterectomies and tumors. I did everything then and they were motivated to write it. I think in order to get a team... It's important to get a team together that has reason to publish.

Dr. Edward Benzel:

Once you do that and dealing with motivated people, the job becomes a lot easier. Then, just a quick story. I was at LSU in Shreveport and there was a gentleman there in the basic science unit who was an old friend of John Jane from University of Virginia. Keep in mind, I'm like a year or two out of residency. He said, "Could you invite John Jane to be a visiting professor here?" I said, "Geez, I guess so." I did. He came and he then invited me to be a visiting professor at the University of Virginia because he was somewhat impressed with what I had put together with the residents and the laboratory and the publications. It was an amazing jumpstart to my career, giving me confidence and exposure to not just John Jane, but lot of his faculty, et cetera.

Dr. Max Boakye:

The next two questions kind relate to that topic of resident training and fellow training and education of residents. What do you tell the residents about the cognitive versus the psychomotor in terms of their learning and growth and transformation into the skilled surgeons? Do you emphasize more the cognitive decision making skills development or the psychomotor development and how do you get them to stay sharp and continue learning?

Dr. Edward Benzel:

First of all, it's selection and nurture. We select good residents and then nurture them. As far as the psychomotor and surgical skills, practice, practice, practice. As far as the decision making process, from my perspective, I think where I have the most to offer a resident is in the outpatient clinic and talking about patients that we see and what options there might be and why would I do this or why wouldn't I do that, and engaging the resident in the decision making process. I think the decision making process is iterative as well as the psychomotor skill acquisition.

Dr. Max Boakye:

What is your advice to surgeons training the next generation, what they should know about teaching and education? In other words, what is your educational philosophy? How to improve as educators? If I may ask, maybe your thoughts about how spine surgery should be taught.

Dr. Edward Benzel:

I think fundamentally, I think we at the Cleveland Clinic do a very good job. It's basically on the job training. I've been at Cleveland Clinic for over 21 years. Throughout this period of time, there's been a huge transformation to the point where when we have acting interns visiting and I interview them after their month with us, they invariably say how much they learned from the residents and how the residents were so open to teaching them and helping them, and so giving of their time to the applicants and they could just list the resident after resident, after resident, it would be different ones for different people. My comment to that is it's family. We're a family here. I think that is part of the on the job training. They've learned how important being a member of the family is and how important it is to teach others and to bolster each other up, et cetera. It's basically an attitude.

Dr. Max Boakye:

Would you say that's the advice to surgeons that are training next generation is it's about the culture, creating the family environment for...

Dr. Edward Benzel:

Yes. My advice would be to create an enriched environment in which to learn and the rest will come.

Dr. Max Boakye:

That's great. I want to ask you next on your textbook on Complication Avoidance, this is one of the most famous textbooks in spine surgery. It's about how we prevent complications in spine. Can you summarize how best a surgeon can minimize the complications? I think we've talked about some of this already, your decision making and heuristics and all that, but what are some of the most common reasons or errors of thinking that lead to iatrogenic complications?

Dr. Edward Benzel:

Well, not thinking about it and not understanding that a complication could be looming, so recognition of a speed bump or a potential problem is critical and being careful and understanding anatomy and trying to anticipate next moves, I think is critical. An operation is basically a series of steps. Just like if you put your pants on before your underwear, you're not going to look very good at work. If you do things in the wrong order, but do the right things, that's not going to turn out very well with surgery too. The progression from the incision to the closure should be thought out and should be emphasized in the training process, particularly in the junior years of a residency.

Dr. Max Boakye:

What do you say to a young surgeon who has a major complication early in their career?

Dr. Edward Benzel:

Well, I am reeling in a complication I had and the advice I would give to that surgeon is advice that I have trouble heating myself. Let's go back to football. If a quarterback throws a pick six interception and a touchdown for the defense, the really good quarterbacks will assess, consider what went wrong with that play and imprint that into their brain as part of a learning process, and then put it behind them. It's a little bit more difficult when you're dealing with a human life and you really can't just put that behind you like a quarterback, but I think part of the catharsis of dealing with complications is doing what I just said, but also embracing the patient and not admitting guilt or error, but unless there was, I think being

honest is very important, but expressing sorrow, "I'm really sorry this has happened. I can't imagine what you're going through." I just think that being empathic is very important during this period of time, but learning from it and to some degree, putting it behind you is critical because you can't be thinking about this complication every five minutes during your waking hours.

Dr. Max Boakye:

That's awesome. Now, we touched on this a little bit, but I think rehashing this is important. Can you list five cardinal sins for a spine surgery that can lead to complications? I think one of them, you mentioned is inadequate knowledge of the anatomy.

Dr. Edward Benzel:

Yeah. And not anticipating problems.

Dr. Max Boakye:

That is two.

Dr. Edward Benzel:

Yeah. Well, you're counting. Okay. Overestimating one's own ability, not operating on the right diagnosis. If a patient has a chronic pain syndrome, I don't care if they have an L4-5 spondylolisthesis, they're not going to get better with a fusion operation. Identifying chronic pain syndrome, which basically is looking for patients who have 24/7 pain, pain that we operate on doesn't usually goes away with certain positions, et cetera, non-restorative sleep, chronic fatigue and suffering. Suffering is an emotion. When patients have these problems, they need to be seeing a pain psychologist, not having a visit to the operating room. I think that is a major way to improve diminish complications. Again, you already mentioned this, talking to colleagues, particularly tough cases. You don't want to be an out there on an island making decisions yourself.

Dr. Edward Benzel:

I don't care how old I am. I still want to have the ability to consult my colleagues. I guess what I didn't say earlier when you were talking about consulting colleagues is that I do it every week at a event called the Spine Tumor Board. I often change a strategy that I'd concocted for a patient based on advice from an oncologist, from a radiologist, from another surgeon. That advice can be extraordinarily valuable. Not seeking advice, not diagnosing chronic pain syndrome, overestimating abilities, wrong operation, lack of adequate resources. You don't have the resources, get the patient to another institution who does or get the resources. I don't know how many that is, but I'm going to call it seven.

Dr. Max Boakye:

Yeah. I think it's seven. We'll call it the Dr. Benzel seven cardinal sins for a spine surgeon. One thing, I'm trying to find a right word. Kind of interesting, early on, you mentioned that you've readjusted your schedule and you're spending one week a month with your spouse. The next question gets at the burnout. That sort of thing is a wellness thing to do that may rejuvenate you. Have you seen a burnout in spine surgeons? How common is it and what can be done to avoid that?

Dr. Edward Benzel:

I think it's much more common than we might think, because I only see burnout when people, for the most part, admit that they're burnt out and most people don't admit that, but this COVID pandemic has really stressed people. Complications, stressed surgeons cause them to ask the question, "Why am I doing this? Having the imposter syndrome, I'm causing more complications than I am benefits for patients." I do think that we're under a lot more stress now.

Dr. Edward Benzel:

It's particularly relevant in younger surgeons who can't do what I could do, go part-time or quit. They have to stay in the business almost. They have to find a way to cope and that leads can lead to burnout. I think one of the most difficult parts of having this time off for me is to not fill it with work related activities, checking my emails, et cetera, but drawing the line at not seeing patients during that period of time and trying to manage my time. To my wife's surprise, she doesn't mind me being home that week. I think I've least scored one minor victory in the first three months of my 80% employment.

Dr. Max Boakye:

Oh, that's great. That's really fantastic to hear. The interesting thing as neurosurgeons, we don't have sabbaticals where you could take six months off. After let's say 20 year of practice, take six months off and then come back, go do something and then come back. That's not a very common thing.

Dr. Edward Benzel:

May not be a good thing to be away for a while. How long does it take to get rusty and lose skills? I think a week long sabbatical is probably not too risky.

Dr. Max Boakye:

You wrote the bible on biomechanics of the spine, which is now in its third edition.

Dr. Edward Benzel:

Actually, Max, we've just finished the fifth edition. The book has been renamed, Benzel's Spine Surgery, and I have three editors, Sig Berven, orthopedic surgeon from UCSF, Mike Steinmetz, neurosurgeon from the Cleveland Clinic. Anyway, I derailed you. I apologize for that, but it was quite an honor to have the book name changed with my name and big letters on the cover.

Dr. Max Boakye:

That's really great to hear. I apologize for getting a third... I took your bio from the website. Glad for the updates. That book has been around for almost 20 years or more than that. Have you seen improvements in biomechanical knowledge among young trainees?

Dr. Edward Benzel:

Yeah, I have. I am somewhat disappointed with the fact that a lot of trainees and young surgeons just want to know where to cut and who to cut on and not necessarily the reasons why, and that disturbs me because there's a lot of misadventures that can be avoided by understanding the anatomy, understanding the biomechanics, et cetera. I think really good surgeons probe into the physics and the biomechanics and the anatomical aspects of the surgeries they do more than those who aren't really good surgeons. My book, Biomechanics of Spine Stabilization discusses the physics basically of what we do with much of our spine surgery, but I've quite honestly been disappointed to one degree or another

with young surgeons and older surgeons alike who are more interested in just simply determining where to operate and what operation to do rather than why they would be doing it and to understand the physical principles that underlie what we do. Again, that's disappointing to me and it leads to unnecessary surgery. It leads to bad decisions regarding surgery, and it can lead to more operations because surgeries fail. Understanding how implants are loaded and how intermediate screws, for example, make a big difference in how a bone graft is loaded in the cervical spine is critical to the decision making process and making good choice decisions to minimize complications.

Dr. Max Boakye:

I believe you and I have talked about writing a book, a project to help accelerate the learning of biomechanics for [inaudible 00:31:13], but as a subject of a different conversation, maybe a later podcast, when we make progress in that endeavor. I want to get your thoughts about spine surgery trends. In your vast experience, what has surprised you the most about the evolution of spine surgery? Did it take some turns that you did not anticipate?

Dr. Edward Benzel:

Oh, yes. People often ask me about technologies and I make a prediction and it's wrong, but my predictions are based on what I think should be the right thing to do and success with new technologies often has much more to do with marketing. Then, it has to do with the actual technique itself. There's been a lot of surgical treatment strategies that have gained significant popularity quickly and then declined in use because people eventually see there's complications and they can't reproduce the original studies. What was once blind enthusiasm now turns to criticism and I tend to be on the very cautious side regarding new technologies. That is reflected in my inability to predict which ones are going to be ultimately successful. One of our problems with new technologies is that they're expensive, and somehow we've got to come to grips with the cost of care, because if we don't, the politicians may force us to do things we feel are not appropriate.

Dr. Max Boakye:

Which of the new technologies are you most excited about? There is artificial intelligence. There's robotic spine surgeries. There's minimally invasive technologies. Are we entering an error where some of these might become standard of care? Are there any ones that you are very excited about?

Dr. Edward Benzel:

Well, yeah. Artificial intelligence and machine learning give us an opportunity for the computer to make a decision about candidacy for surgery, taking into account patient quality of life related metrics, et cetera, and can get to people who have a chronic pain syndrome without us having to do it. What's disappointing about that to me is that we should be able to sort out who's got a chronic pain syndrome and who doesn't? That's basically what the machine's going to tell us if it says, "Oh, don't operate on this patient." It's almost certainly going to be because the patient's complaint and the imaging don't correlate with each other. They must correlate. We operate on the patient, not on the imaging study. To get to your point, I don't understand the enthusiasm with robotics. I think minimally invasive surgery is here to stay.

Dr. Edward Benzel:

Anytime you can do something with less invasion, that's great and the techniques are getting better and better, and the surgeon skills are getting better. I don't do these. It's not my skills that are, that I'm

looking at. I'm looking at the generation that's coming up next, but a big but is that these things are still really expensive. We spend about 20% of the gross domestic product on healthcare. We as a country, we as a world can't afford this. We need revolutionary strategies that decrease the cost and increase the quality of healthcare and spine care.

Dr. Max Boakye:

If you were to have spine surgery today, would you go for minimally invasive or open or it doesn't matter?

Dr. Edward Benzel:

If I were to have surgery, first of all, I'd pick a surgeon and I'd do what the surgeon wants. I don't think shopping around is the right thing. I'd ask my surgeon. My wife had surgery by one of my partners. Whatever he said, "Okay. I'm with you, because I trust you." The patient should trust the surgeon and go with what they wish. Now, I refer patients to partners who I think might benefit from minimally invasive surgery. I'm not anti-minimally invasive surgery. I just don't do it myself.

Dr. Max Boakye:

We seem to be also headed for an error of awake spinal fusions and spinal anesthesia. Do you think this is a fad or something here to stay?

Dr. Edward Benzel:

I really can't comment on this. It's probably less expensive. That's a good thing. Anytime you put a patients sleep, you take a risk. I really am not knowledgeable enough to comment intelligently on this. I just say I'm going to wait and see how things evolve.

Dr. Max Boakye:

With regard to artificial disc arthroplasty, your thoughts on their impact? They don't seem to have taken off as much.

Dr. Edward Benzel:

Yeah. Are you referring to cervical or lumbar or both?

Dr. Max Boakye:

Both.

Dr. Edward Benzel:

We don't even really know what causes back pain. In the lumbar spine, artificial disc would be used to treat back pain. In the cervical spine, they're used as a spacer after decompression of the spinal canal after a discectomy. Interestingly, the data which is abundantly clear to me pre-era of the artificial disc is that adjacent segment degeneration and adjacent segment disease appears to be unaffected by fusion, and yet the idea behind an artificial disc is that it diminishes adjacent segment disease. Every study that has been done regarding artificial discs has been done by surgeons who are pro-artificial disc. The studies were designed by them. The bias, the win or lose bias on the part of the patient, the study designed bias, the decisions regarding complications and the need to re-operate are all made by the surgeons in the study. I'm not saying that artificial discs aren't an appropriate alternative, but they most

certainly are not a panacea. Again, I emphasize the fact that adjacent segment degeneration and disease is probably independent of preservation of motion, at least in the cervical spine.

Dr. Max Boakye:

I want to ask you about two conditions. They are probably the most common conditions that spine surgeons treat. One is back pain, the other is cervical spondylotic myelopathy. When you are seeing a patient with acute back pain, are there certain things that can be done to prevent them from becoming a chronic back pain patient?

Dr. Edward Benzel:

Yeah. Doing compliance with doing exercises and working on core strength and flexibility exercises and a commitment to that treat early. If the patient is gliding down a slippery slope, try to get them to a chronic pain treatment team. We have one at the Cleveland Clinic, probably most institutions do to some degree, but a good pain psychologist is a very valuable colleague to have in an institution. I think getting them there early, when a patient's had chronic pain for seven to 10 years, it's a really difficult nut to crack and they don't want to hear anything about going to see a psychologist. They just know that another operation is going to be the ticket to their success. Sometimes maybe oftentimes that type of patient becomes very upset with me because I'm not going to operate. You also mentioned cervical spondylotic myelopathy.

Dr. Max Boakye:

Yes. I'm going to get to that in a minute, but I have a couple of more questions on back pain. One of the unsolved problems is the patient who comes to you with a degenerative disc, one disc that is degenerative and a black disc. They don't have stenosis. They don't have spondylolisthesis. What are your thoughts on doing surgery for that patient?

Dr. Edward Benzel:

I don't think I have ever done an operation on a patient like that. There's no motion. There's just degenerative changes. Whether it's the cervical spine or the lumbar spine, I am not going to recommend surgery, particularly for "a black disc" or the high intensity signal changes in a disc. I think that represent surgeon's looking for people to operate on. Those are the patients, I'm betting who then go on to have the "failed back syndrome," which is treated oftentimes with more and more surgery.

Dr. Max Boakye:

How do you handle the very difficult situation of a patient that comes to you with significant mental health issues, depression and anxiety, but has severe stenosis or spondylolisthesis?

Dr. Edward Benzel:

And they're symptomatic from the anatomical finding on imaging?

Dr. Max Boakye:

Yes.

Dr. Edward Benzel:

Well, I make it mandatory that they see somebody in our center for pain recovery, which is a multidisciplinary chronic pain team and that they oftentimes will say, "Let's try this and try that," and basically get the patient to a better place, so they have a greater chance of having a good outcome, particularly the patient who is on opiates. I will refuse to do a non-emergence surgery for pain on a patient who is on chronic opiates. The chance that they will have pain a year after the surgery is virtually 100%.

Dr. Max Boakye:

Interesting. You were a co-author, a [inaudible 00:41:40] paper. I think [inaudible 00:41:41] was a first author on a paper on laminoplasty. For treatment, I think it was either a randomized clinical trial on the treatment of cervical spondylotic myelopathy. How are you treating CSM? What is your favorite procedure? What are your thoughts about laminoplasty?

Dr. Edward Benzel:

Somebody asked me this the other day, "What's your favorite operation?" I said, "Laminoplasty." They said, "Why?" I said, "Because it works so well." That paper, there's more to come because there's longer follow up, but it compared anterior operations to posterior and the surgeon could choose a laminectomy infusion versus laminoplasty. At two years, laminoplasty is pulling away from the other two in all categories, including health related quality of life metrics, cost, and return to surgery. I just did a gentleman on Monday. Today's Tuesday. He's big man and he has a C3-4 disc, but some generalized stenosis in that region. I felt that discectomy might not completely get him decompressed. I thought he was high risk for dysphasia and for hoarseness, so we did a C3-4 laminoplasty and the patient says, "I can't believe this."

Dr. Edward Benzel:

He says, "I could hardly walk yesterday and I just took laps around the inpatient ward floor. I'm just amazed." Patients in general do very well. The laminoplasty does not burn any bridges. You can still do an ACDF if you need to, or still do a fusion if you need to. I've been increasing my indications to operate on even straightened spines, and I've been very happy with it. I've seen a couple of those patients actually gain some lower doses. I think oftentimes, the straightened spine is a manifestation of reflexive positioning of the neck to minimize compression of the spinal cord.

Dr. Max Boakye:

That's very interesting. If you add straightened spine, what percentage of CSM patients might be treatable by laminoplasty? About 80%? 90%?

Dr. Edward Benzel:

I'd say yeah. In my practice, that's the case.

Dr. Max Boakye:

It's interesting that in the patient that you described, it was a single level. In some papers, it's been emphasized, for example, Barth Green would say you always had to do like a C3 to seven... Kind of take the C2-3 into spinals ligament and the C6-7 into spinals ligament and do a C3 to six in all patients.

Dr. Edward Benzel:

Well, why? To use my partner, Iain Kalfas' phrase, "Treat today's problem today and tomorrow's problem tomorrow." Doing prophylactic decompressions does not make sense to me when there's a downside to everything we do, not only upsides.

Dr. Max Boakye:

I think they were referring to, if you have multi-level stenosis and you want the cord to float away, that even if there's no stenosis six, seven, you should still do it because you get the floating of the cord back.

Dr. Edward Benzel:

I don't do that, but I have extended my indication still like just the two level laminoplasties. I've done several of those in recent months, whereas a year ago, I wouldn't have. I'm just becoming more and more comfortable with that operation.

Dr. Max Boakye:

For the surgeons in the audience, what is your lamino technique? How do you do yours?

Dr. Edward Benzel:

I open the most symptomatic side, so I do a trough on that side all the way through. Then, I go to the hinge side and score with the high-speed burr, just very gradually and seeing it until I get the motion I want and I'm able to lift the... Open the door, if you will. I will oftentimes undercut the level above or below if there is some stenosis, but at that level. As opposed to what you were talking about earlier, I try to limit the number of levels to the levels of compression. Then, I put in the spacer.

Dr. Max Boakye:

What kind of spacer do you use?

Dr. Edward Benzel:

I use either the Stryker or Globus spacer.

Dr. Max Boakye:

Okay. Do you use any plates on top of the spacers?

Dr. Edward Benzel:

What do you mean by that?

Dr. Max Boakye:

Like the spacers go between the open door and the facets, right? You don't put any place on top to hold it in?

Dr. Edward Benzel:

No, the spacers have little holes for screws and I screw it.

Dr. Max Boakye:

Oh, I see.

Dr. Edward Benzel:

[inaudible 00:46:37].

Dr. Max Boakye:

I see. Okay.

Dr. Edward Benzel:

And the lateral mass.

Dr. Max Boakye:

Okay. I see. That's great. That's fantastic. Thanks for explaining that. I think the surgeons in the audience would really love that.

Dr. Edward Benzel:

By the way, you're talking about cervical spondylotic myelopathy. Just for the surgeons in the audience and for all primary care doctors, cervical spondylotic myelopathy is a surgically treatable cause of old age. By that, I mean, so many primary care doctors say, "Well, you're stumbling around. You're 70. It's just you're getting a little loss of neurologic function due to age." Senility. Senisits, if you will. The reality of it is the patients are really myelopathic and they have a potentially surgically treatable problem. Educating for the surgeons in the audience, educating your primary care constituency regarding the importance of establishing this diagnosis, I think is critical. The nice thing about cervical spondylotic myelopathy, usually they're not complaining of pain. You're dealing with a much easier audience to deal with. When pain is the major complaint, outcomes are not going to be as good as with disability when disability is the major complaint.

Dr. Max Boakye:

That brings me to a couple of more questions of laminoplasty. Actually, you mentioned cost. Just a plug in for a paper we published recently looking at a cost of treating CSM using different procedures. We came to the conclusion that laminoplasty was the most cost effective study. It was published in Journal of Neurosurgery Spine. I will link it to your paper on the podcast notes, but a couple of more questions on laminoplasty. One of the reasons some people don't do it is that A, you have foraminal stenosis multi-level, and also there is a significant component of a neck pain. Some people say you may have too much neck pain after laminoplasty. Has either of those things been a problem for you?

Dr. Edward Benzel:

No, I don't see. This patient that I spoke of that I operated on yesterday is 260 pounds and really a heavy guy. He's up and around and he's got pain, but I don't look at pain as a contraindication to surgery. I discussed the notion that pain will not... This operation is not designed to treat pain. Regarding foraminotomies, I don't hesitate to do foraminotomies if I think there is a need for that at, say a C5-6 foraminal stenosis. I'll do that if the patient needs a laminoplasty for decompression of the central canal, but also has maybe a radicular component, I will do a foraminotomy. On the open door side, I will do that first. If there's a foraminotomy to be done on that side, I use the trough for the creation of the open door as my entry point for doing the foraminotomy. If it's on the other side, I just do it as I usually would. It's pretty straightforward. I will combine foraminotomies with laminoplasties.

Dr. Max Boakye:

Wow. That is awesome. More questions. Once again, for these surgeons in the audience, these are for young surgeons actually. These are very practical decisions for common scenarios. There's not randomized clinical studies for these, but I just want to know what your vast experience, what has been your practice? First, these are rapid fire questions, short answers. Do you brace after a single or two level lumbar fusion?

Dr. Edward Benzel:

Well, I don't do those anymore, but the answer is no. The bracing does so little compared to a solid fusion that I think there's morbidity associated with muscle atrophy, skin issues, et cetera. The answer's no, and no.

Dr. Max Boakye:

Do you use Toradol for post-operative pain control?

Dr. Edward Benzel:

Yes.

Dr. Max Boakye:

If you don't, what other things have you found really good?

Dr. Edward Benzel:

I just watch kidney function, but yes, I use Toradol and I consider it magic medicine. It significantly diminishes pain in the majority of patients.

Dr. Max Boakye:

Even in fusion patients, there's some traditional [inaudible 00:51:12] inhibitor fusion, so don't use Toradol.

Dr. Edward Benzel:

Right. The more recent data, but I can't quote that, basically demonstrates that it doesn't, we give steroids to patients that have fusions and I haven't seen any diminished fusion rate.

Dr. Max Boakye:

When do you return your cervical fusion or your lumbar surgery patients to driving and physical activity like golf? Do you wait three months, or is it just patient by patient basis?

Dr. Edward Benzel:

Yeah. Sure. It's patient by patient. It depends. Golf is a torsional sport and it depends on how rigorous the patient is. Basically, if it's a laminoplasty, I don't want them doing too much activity until that bone gets sticky. I wanted to have started the fusion process. If they've had an ACDF, particularly a single level, and you felt good about the integrity of the construct, they can probably go out and drive right away. It shouldn't limit activity. Again, I wouldn't want them playing golf and twerking things around, but just doing normal motion, I think is fine. Furthermore, I don't let anybody drive who's wearing a

collar if they were to wear a collar. When people ask, "Can I drive?" I say, "I want you to take your spouse with you. When he or she says you are safe, then I'll call you safe."

Dr. Max Boakye:

Do you do any kind of physical therapy before returning them to their level of full activity?

Dr. Edward Benzel:

Usually do, but not always. I size up the patient. Some people just know what to do, and we have a pamphlet, two ones, one for cervical, and one for lumbar about exercises. Some people say, "I just want to do this. I don't want to go to physical therapist." I'm sort of disappointed often times with physical therapy and not teaching the patient to do what I think they need to be taught. I basically have taken... Teaching them myself.

Dr. Max Boakye:

How often do you get post operative x-rays?

Dr. Edward Benzel:

Well, I get an x-ray before they go home just to make sure that everything is okay. Then, I'll usually get x-ray. Then, my APP will see the patient two weeks follow up, and I will see the patients at six weeks follow up at which time we get an x-ray and then either seeing them at four months with x-rays or just discharging them from clinic at six weeks, depending on how they're doing.

Dr. Max Boakye:

For the hospital administrators and spine program administrators in the audience and for surgeons and trainees, name three things that hospitals in spine programs can do to optimize their spine surgery outcomes.

Dr. Edward Benzel:

We have a project here where we're having patients who are going to have a lumbar spine fusion operation, seeing our chronic pain team before surgery. It seems to be working. We're actually doing a study on this, and it seems to be improving postoperative outcomes. Getting patients mentally prepared for surgery, as well as physically prepared for surgery, I think is critical. I keep coming back to this chronic pain notion and a way to help prevent that is to meet it head on upfront. What else can administrators do? I don't really know, except if their surgeons are motivated to do the right thing, give them the resources to allow them to do it.

Dr. Max Boakye:

That's great. You are known for many sayings, catchy phrases in spine surgery, kyphosis begets, kyphosis, a full with a tool is still a fool. If your only tool is a hammer, everything looks like a nail. The reason I bring these up is there's been a lot of... New York Times wrote an article about the excessive rates of spinal surgery, spinal fusion in the United States. I know you are very well-traveled. You've traveled around the world, around Europe. What are some of the differences that you've seen between the rates of spinal surgery in the US and in Europe, and what are some of the things that could be done to make sure that the rates of unnecessary spine surgeries are low?

Dr. Edward Benzel:

Well, I mentioned machine learning and causing people to establish diagnosis other than an imaging finding, but you can't legislate common sense and people will invariably scam the system. Okay? We need ways of demonstrating who will benefit from surgery and who won't. That's where this machine learning and artificial intelligence, et cetera can potentially help us, basically making decisions upfront on whether this patient is a good candidate for surgery. If they're not... What I mean by a good candidate for surgery, a good candidate for having a good outcome with surgery. You could say the patient's a good candidate because they have an L4-5 degenerative spondy, but that doesn't mean they're a good candidate for having a good outcome for a lumbar fusion. That's very different.

Dr. Max Boakye:

The last question for you, Dr. Benzel, is my magic wand question. This is a question I ask every guest. If you had a magic wand, what research questions would you like to see answered? What would you do with the wand to really have the highest impact on the spine surgery world?

Dr. Edward Benzel:

If I could wave my magic wand over all spine surgeons, I would cause them to critically evaluate not the imaging, but the patient. Talk to the patient, understand if they have 24/7 pain, understand if they have restorative sleep or chronically fatigued, understand if the pain bothers them all the time and understand the importance of establishing the type of back pain. Surgeons will say, "If the patient has back pain, I'll do such and such." Well, what is the characteristic of the back pain? Do they have myofascial pain? Is the pain episodic, or do they truly have mechanical back pain? Pain that is deepen, agonizing in nature, is worsened by loading, and most important is improved by unloading. If they have those things, those characteristics, that patient just may benefit from an operation. If they don't, they probably won't benefit. Back pain isn't back pain isn't back pain. Break it down, describe it, characterize it.

Dr. Max Boakye:

That is great. That is really fantastic. This brings us to the end of a really incredible hour. There was so much there, so many invaluable pearls, and it's just incredible hour with Dr. Ed Benzel, one of the world's foremost spine expert. We really want to thank you, Ed, for taking the time to speak with us. You've really taught us a lot about back pain, laminoplasty. Your work, your textbooks have really taught generations of spine surgeons, and we really appreciate you're taking the time to really distill some of these lessons you've learned in your best career to the audience. I believe there was a lot of information that is beneficial, not only to spine surgeons, residents, trainees, administrators, and patients. Thank you very much, Dr. Benzel. We appreciate it.

Dr. Edward Benzel:

You bet. Thank you for having me.

Speaker 1:

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