

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. Maxwell Boakye:

Welcome to the Optimal neuro/spine podcast, this is episode 21. Today we are speaking with Dr. Steven Kirshblum on spinal cord injury. Dr. Kirshblum is chief medical officer of the Kessler Foundation in New Jersey. He's a nationally recognized expert in spinal cord injury, rehabilitation and research. He also co-directs the foundation's renal center for spinal stimulation, and dissenters for spinal cord injury research. He's board certified in physical medicine and rehabilitation, and spinal cord medicine at Kessler Institute for rehabilitation, which is part of the Select Medical Corporation. In addition to serving as chief medical officer, he's also the director of spinal cord injury services. He's a professor and chair of the department of physical medicine and rehabilitation at Rutgers New Jersey Medical School, and is program director for the spinal cord injury medicine fellowship program.

Dr. Maxwell Boakye:

As project co-director of the Northern New Jersey spinal cord injury model system, one of only 14 federally designated centers in the country, Dr. Kirshblum oversees spinal cord injury research, and its translation to patient care. He has written hundreds of articles, abstracts, monographs, book chapters. And is the editor of a very popular textbook Spinal Cord Medicine, which is now in its third edition, and also author of a children's book about spinal cord injury. He has been honored by numerous professional and humanitarian organizations, and is consistently named among the top physicians in his field by independent surveys. He's a member of the board of trustees for the American Spinal Injury Association, and a past president of the Academy of Spinal Cord Injury professionals and American Paraplegia Society. He also serves in numerous advisory boards and foundations for spinal cord injury research.

Dr. Maxwell Boakye:

Today, we want to talk to him about spinal cord injury more from the clinical perspective. In previous episodes we've talked to other scientists who are studying spinal cord injury, is going to be a physiatrist who is extremely knowledgeable about past and current management of spinal cord injury. And I couldn't think of anyone better to talk to us about the current state of spinal cord injury treatments. Dr. Kirshblum it's very nice to have you here. Welcome to the program.

Dr. Steven Kirshblum:

Thank you so much, and for that very warm welcome.

Dr. Maxwell Boakye:

Excellent. Let's start by you telling us a little bit about what the current management pathway for spinal cord injury. And when somebody gets a spinal cord injury, how are they currently treated? And how is it different from let's say 20 years ago?

Dr. Steven Kirshblum:

Sure. So let's start with what the current pathway or roadmap is. And I think it could be divided into on scene management, trauma care, acute medical and surgical interventions, then acute spinal cord injury specialty rehabilitation, then long term and preventive care. Most of these has shown tremendous improvements in the last decade, including more consistent acute management, early surgical intervention, greater technology, greater understanding of the spinal cord injury that can enhance a person's life. Who unfortunately may sustain a spinal cord injury. I will say that the treatment continues to improve in many of these areas most especially early on after injury at the scene, and the trauma management as well.

Dr. Maxwell Boakye:

In your opinion, what are some major problems and challenges that still remain?

Dr. Steven Kirshblum:

Yeah. I'm really thrilled with some of the great enhancements in acute management that I just mentioned. And we can talk a little bit more about some of those things, but I do have some concerns as well. I'm concerned with changes in the next phases, and the aftercare of people who sustain a spinal cord injury. Denial of specialty spinal cord injury rehabilitation care, significantly shortened length of stay, denial of needed equipment and adaptive devices are really some of the greatest concerns that I have. Both in the early time periods after injury, and even in the later timeframes. Specifically, patients are sometimes going to any sort of rehab, or even in some places being denied rehabilitation instead of the specialty care for people with spinal cord injury.

Dr. Steven Kirshblum:

And the benefit of specialized care, including experience of staff impacts their outcomes. Their treatment of their medical issues, their psychological and neuropsychological support if needed, and certainly greater opportunity for spinal cord specific technology, education, and peer support. And lastly I would just say that during the later phases, the importance of following up with a physician who truly understands spinal cord injury is critical, but is often neglected. Because the ability to follow up with a specialist will allow for not only quick treatment when problems arise, but could also prevent expected medical complications that occur in spinal cord injury from even occurring in the first place.

Dr. Maxwell Boakye:

So now, and if you have a spinal cord injury, it's recommended that you be treated at a level one trauma center. To what extent is the rehabilitation centers also certified to treat spinal cord injury? How is it now, and is the access to top rehab centers still the problem?

Dr. Steven Kirshblum:

It is, and it's for a few reasons. I think that you're absolutely correct that if you have a trauma, going to a trauma center is well known. But I think what happens is that people forget that specialty centers for trauma, and specialty centers for other high risk type of problems, everyone views as critically important. But when it comes to spinal cord injury rehabilitation, people think that any place can take care of them, and it's not the case. There are specialty spinal cord centers across the country. And certainly as you mentioned earlier, there's the model systems, but that's only one. There are only 14 model systems in the country. So I wouldn't say in any way that being a model system is the only place that people can get specialty care. Throughout the country, and in most states, there are specialty centers that specialize in spinal cord rehabilitation. But the importance of these type of centers cannot

be overemphasized. Their aftercare is as important as their acute care management, to be able to achieve the maximum potential that a patient can in the future.

Dr. Maxwell Boakye:

What limits the access to this? Is this just insurance or physician lack of knowledge to refer to the appropriate rehab place?

Dr. Steven Kirshblum:

Yes, this is a really important aspect of it. I think one is understanding and knowledge that there are differences between general rehabilitation, and specialty rehabilitation. And oftentimes, that hospitals are eager to move patients quickly. And so therefore we'll refer to multiple sites without truly understanding. Not that they're doing anything knowingly wrong, but truly understanding what the specialty need is for the patients. Because spinal cord injury is not all that common, so therefore people may not be as familiar with what exactly they may need. But insurance also plays a role. Some places will cover some places and not others, and that is an unfortunate type of thing. And then people have to know how to advocate for what truly their benefits may be able to get them.

Dr. Maxwell Boakye:

Wow, that's very interesting. I didn't realize that was an issue. I assumed everybody goes to a level one trauma center, and most people have access. So it's very interesting. We need to create a greater awareness that this is really not the case. What distinguishes a specialist rehab? The physiatrist there, are they specifically trained? Do they have additional credentials in spinal cord injury medicine?

Dr. Steven Kirshblum:

Yes,, excellent question. Because there is a subspecialty, it's an ACGME approved subspecialty. Just like cardiology is a subspecialty of internal medicine, spinal cord injury medicine is a subspecialty that people can go into. Most of them are specialists in rehabilitation, with a subspecialty and spinal cord injury. But it is additional training. And certainly as physicians know, it just means more exams and more CMEs that need to be done to maintain their credentialing. But it goes beyond just the physician. It goes to the experience, and the staffing level and capability, and expertise in all the different team members that go into the care of the patient. The spinal cord nursing, the therapists that specialize in spinal cord injury, the psychologists, the neuropsychologist.

Dr. Steven Kirshblum:

People have to understand that in traumatic spinal cord injury, think of it this way. If a trauma in a car accident is enough to cause a spinal cord fracture because the person head hits the, let's say the steering wheel, that's going to be enough trauma that's going to cause potentially head injury as well. And while it may not show up on the MRI or the CAT scan, it certainly is enough to cause significant enough injury, to cause some manifestations of brain injury. And this is very important to pick up in most places that will not pick it up, unless they're a specialty center.

Dr. Steven Kirshblum:

And two other things I'll mention importantly, and probably more. One is the importance of peer support, you need a large center in order to be able to have a large peer group. I've been in spinal cord medicine, and I appreciate everything that you said about my background. I could write textbooks and

articles, but at the end of the day no matter how much experience I have, and I talk to the patient. They see me walking out of the room and I can tell them all there is to know about perhaps neurogenic bowel, and bladder, and spasticity neurogenic pain.

Dr. Steven Kirshblum:

But when they hear from a patient, from a person who's lived it, who lives with it and how they were able to overcome some of the deficits that becomes pure, that becomes true. It means so much more to the patient. And I don't mean one is better than the other. It's part of what this specialized team is all about. We have an entire peer group program, we have an education program that goes into this. And that is part of what makes people understand what's going on better for themselves, and enhances their lives as well.

Dr. Maxwell Boakye:

Is there publications that show that specialist rehabs makes a difference in, for example, how much pressure ulcers you have? Or how well you eventually are integrated into the community psychologically? How well you do, your bowel function? Is there data on that?

Dr. Steven Kirshblum:

Yes, there are. So there's really interesting data that shows very similar to the data, that suggests and supports the importance of going to a higher level trauma center if you have a trauma. There are similarly articles that people who have traumatic spinal cord injury, going to a spinal cord unit, the benefits to the patient from both a medical standpoint. As you mentioned pressure injuries, and in terms of overall costs of care. Because people know, have more experience in dealing with the issues, and getting the patients home. So yes, there are references for that.

Dr. Maxwell Boakye:

One of the things that is near and dear to my heart is racial and ethnic disparities. As you know, we've seen it in a number of conditions, how bad is it in spinal cord injury, and what can be done about it?

Dr. Steven Kirshblum:

Unfortunately, there really are disparities. Including the opportunity to obtain the care and the resources that others may have, that are becoming greater recognized. So I think that more and more people are starting to recognize these disparities. And they come in many forms, including referral for specialty services. It's interesting for example, that less people of color are referred overall for rehabilitation. That's probably a topic for another time as well. But also on top of that, depending upon coverages, approvals for needed adaptive equipment such as lighter weight wheelchairs is impacted. It affects discharge placement, follow up services, all that negatively impact not only the medical condition of the person, but their mood and their quality of life.

Dr. Steven Kirshblum:

But I also think it's important that when we think about disparities, racial and ethnic, there's also that disparity and unconscious bias towards the disabled community. This presents almost a double burden, if you will, for people who with previously mentioned biases, for the people especially of color who have. And of social disparities that had it already biased, now being disabled, there's even more of a, unfortunately, disparity in their healthcare as well.

Dr. Maxwell Boakye:

I think what I'll do is bring you back for a deep dive on just that topic. Because as you mentioned, we could devote a whole program to that. So in a part two at a later date, I'll bring you back and we'll focus specifically on the disparities in SCI treatments. Let me delve a little bit into integration of SCI care. So right now, when you get an injury, you get treated at a level one trauma center. And if you're lucky you go to a good specialized rehab. But after that, how long do they stay in the rehab? And then what happens after that? Seems to me, there is very poor integration. So when they are in the community, their care is not very well coordinated. Because they're generally managed by primary care physicians who may not have any knowledge of spinal cord injury. Is that correct?

Dr. Steven Kirshblum:

Yeah. So there's a lot in there. And I think that in terms of length of stays, the real unfortunate reality is length of stays in both the acute center, and the rehab center is decreasing. Certainly one of the many challenges that we have in the field. But I think in terms of the question of integrated care in medicine overall, I think that we are fairly siloed. With each specialty doing their part amazingly well, but without true collaboration. And this does not in any way mean that at some centers there isn't tremendous integration AND collaboration, but I think it's less common. And I believe what I really want to think about the way that we could do something better, is to recognize that it's the patient and their issues that need to be at the center of attention. And different specialties consistently working together in understanding not only what they can do, but the benefit of everyone in the team that can work together.

Dr. Steven Kirshblum:

So the example you gave of the primary care physician, the primary care physicians are absolutely fantastic. But we need greater integration and collaboration of the primary care physician, working with the spinal cord specialist in terms of really benefiting the patient as time moves forward. And this includes understanding that primary care for the disabled population is a really important aspect. Certainly spinal cord injury brings with it so many other issues that are so prevalent with their diagnosis, neurogenic bowel, bladder spasticity, pain that most primary care physicians don't see. But is the bread and butter of the spinal cord physiatrist. So hopefully greater integration is really what will benefit the patient the most.

Dr. Maxwell Boakye:

Let's talk a little bit about emergent trends in SCI care. So in my field of neurosurgery, right now the latest thing is early surgery. So now the trend has shifted that if you come in with a bony compression spine, there's more and more studies showing that you should get decompress as soon as possible, rather than wait. I would say maybe 15, 20 years ago, people will wait two, three days before they do the surgery. Because the thought was if you have a complete injury or even an incomplete injury, there was no need to rush. Now, the pendulum has swung to earlier surgery, and that's the trend.

Dr. Maxwell Boakye:

Another trend is that we keep the blood pressures in a specific range for up to a week, and we are no longer using steroids routinely. In the rehab setting, are there any trends that you've noticed? For example, is locomotor training, is all the rehabs using locomotor training? How much variability is there and what kinds of trends are you seeing in rehabilitation centers?

Dr. Steven Kirshblum:

I think that you're very correct, that the biggest trends we've seen acutely is the adoption of the maintenance of the mean arterial pressure early after this injury. Definitely the early surgery having benefit, and the trends away from routine use of steroids. Within rehabilitation, I can't say that there's uniform agreement as to any specific aspect. Like activity based therapies, or locomotor training. And I can explain part of the reason why in a moment, but I do think that everyone has adopted the understanding of the importance of technology. Especially for high level injured individuals when it comes to mobility, and this technology for activities of daily living. The advanced wheelchair activities that are available, as well as a number of other possible interventions to technology that are in the research realm. Whether includes intermittent hypoxia, exoskeleton devices, myo-controlled robotics, neuromodulation. Certainly something you're so familiar with, including transcutaneous and epidural spinal stimulation. But then also brain stimulation, and brain computer interfacing to name a few.

Dr. Maxwell Boakye:

Let's talk about the problem of polypharmacy. On a previous podcast, we did talk about that. But I would like to hear your perspective on what are some of the potential solutions to the problem of polypharmacy in SCI.

Dr. Steven Kirshblum:

It's a really big issue. And sometimes I see a patient for the first time that may not have had that care here, and I ask them for the list of medications. And sometimes you say, "Oh my gosh, has anyone really seen what the patient is being expected to take?" It's almost like a therapy itself, in keeping track of all the medications. And this is certainly an area where physicians working together could be of greater help. Often, and this is one problem that I see, people remain on medications because they were started initially, but then it remains on the medication list. And I sometimes wonder if the use of the EMR, we go through the electronic medical record and we check off the medications, or someone checks off the medications to make sure that they're still taking it. Without fully acknowledging the reason why the person is still taking the medication.

Dr. Steven Kirshblum:

I'll give you some examples. Stress ulcer prophylaxis should really only be given for 30 days after injury. Yet how many people are still on it a year later? I'm not suggesting that no one needs stress ulcer prophylaxis after that time period, but most often not. DVT prophylaxis, sometimes I've seen patients be on it for years. Because without being followed by a spinal cord specialist, and without any other pre-conditions, the person says, "Well you're paralyzed, so therefore you probably need low-molecular-weight-heparin, or something else for life. And that's absolutely not the case.

Dr. Steven Kirshblum:

Sometimes patients require medications early on that could be weaned off over time, and people just forget to wean them off. Bowel medications is a perfect example. Sometimes you need bowel medications for life, but sometimes you can start to taper them down. Blood pressure medications is another perfect example. So the problem of polypharmacy exists, and I really believe that the treatment for it is making sure that people follow up, understand all the problems that the patient has, and then be able to make sure that list is appropriate on a consistent basis.

Dr. Maxwell Boakye:

Next, I want to talk about spontaneous recovery. And in this regard, I'm speaking to probably the world's foremost expert on this. In particular in May 2021, you wrote a paper in the Journal of Neurotrauma. And the title is Characterizing Natural Recovery after Traumatic Spinal Cord Injury. You are the first author on that paper, and really a fantastic summary of the natural recovery. So let's talk briefly, what should we be telling patients? If I have a patient that I do surgery on who has spinal cord injury, what should I be telling them about their natural recovery? And if they ask me, how is it different from 20 years ago? Are we making any progress in the recovery rates? What should we be saying to that?

Dr. Steven Kirshblum:

Wow. Okay, that's really a great question. And I will have to be reminded that we only have a short amount of time, but I would love to give a lengthy answer, but I'll try to break it down into small parts. By the way, I wrote that article really to give people a one stop shopping for where to go, to get the information. And most importantly, to not confuse older literature with newer literature, especially because there were changes in the definitions in the classification of spinal cord injury. So I really try to bring people up to date with the data. So that's one.

Dr. Steven Kirshblum:

In terms of two, as many of your listeners probably were very well aware, that injuries can be subdivided between the level of injury and the severity of injury. So for levels, you have tetraplegia, paraplegia. And severity you have neurologically complete, versus various levels of incomplete injuries, based upon the present or absence of sacral sparing. When a person's doing the exam on them.

Dr. Steven Kirshblum:

I'll give you a quick breakdown, people with acute traumatic tetraplegia if you examine them within two weeks, if they're complete, the chances of conversion is probably about 30%. With half of these gaining to sub motor recovery. So most stay neurologically complete, but some do convert to incomplete. Only a smaller percentage gain enough motor recovery for significant functional change. People with initially complete paraplegia, the amount of conversions is lower than 30%, it's more like 15%. But here the level of injury is critical. The higher the level of paraplegia, the less the chance of conversion the longer a person remains with a complete injury, the less the chance of conversion. People with incomplete injuries, whether it be tetraplegia or paraplegia, have a much greater chance of significant improvement. Most people with neurologically complete injuries will gain one level of injury.

Dr. Steven Kirshblum:

The vast majority, so if you see them initially and they're a C5, they'll gain back one level to C6. There are some nuances as to who can regain two levels and/or more, and that certainly is more detailed in the paper itself. And in terms of regaining walking, the statistics overall are about 46% of people with incomplete tetraplegia regain the ability to walk at one year, 5% for complete paraplegia, and 76% for incomplete paraplegia.

Dr. Steven Kirshblum:

But I want to make one point really clear, and that is in talking to the patient. People have to recognize that these statistics are based upon groups of patients. If I see a 1000 patients, I can tell them what percentage of those 1000 people. But every single person that we come in contact with, we have to remember that they're just an individual. And while the chances are that a person with neurologically complete injury may not convert. I never tell them you are not going to ever convert because we know

that may not be clear, so I try very carefully. And it's so critically important what we say to patients, and how we talk to them without taking away their hope. But without giving them false hope about what their prognosis may be.

Dr. Steven Kirshblum:

And there is one other point that just popped in my mind, which is... And then it just popped out. So I'll think about it. Oh, if it changed over the last 20 years. And the answer is absolutely. So when I started looking at this data, I started saying, "Oh my gosh, I've been in this field now for 32 years. I don't remember seeing 30% of people converting." So Ralph Marino from Jefferson, myself, and a couple of others took a look at this and we published it just a couple of years ago. And we showed that absolutely a higher percentage of people are converting over the last few decades.

Dr. Steven Kirshblum:

And we hypothesize, although we have no absolute proof, that part of the reasons may be: Netter on scene care, with people that know what to do on the scene. But two, and we talked about this before, the importance of that acute trauma management. Number three, early surgery. Number four could be the maintenance of the blood pressure. And number five, perhaps a decreased use of the steroids. All of these, and I'm not saying any one of these absolute, but all of these taking into account may have led to this greater percentage of conversion early on after injury.

Dr. Maxwell Boakye:

That's really fascinating. So if patients survive, what are eventually causes of mortality? And once again, has that changed over the years?

Dr. Steven Kirshblum:

Yeah. So the leading causes of death are, number one, respiratory. So pneumonia is the most common cause of death in acute and chronic injury. So maintenance of the respiratory function is really key, followed by cardiovascular. Now in the short run, I'll tell you the good news. There has been unbelievable progress made in regard to the early mortality rates after spinal cord injury. And it's because of all the things we talked about, the at the scene, the acute care, the acute rehab management has greatly enhanced early mortality rates.

Dr. Steven Kirshblum:

But here's my big concern, the long term management is not there. And if you remove first year survival rates, the lifespan has not necessarily improved from 20 to 30 years ago. So if you just compare from day of injury, life expectancy has increased. But for those who survive one year, it's not. And this goes back to that issue of lifelong care by a spinal cord specialist. We need to do a better job. And let me give you one example. Respiratory is number one cause of death. Unless you are a spinal cord specialist, you don't recognize what the chances are of patients with tetraplegia developing sleep apnea. The percentages are over 50%. It's so common, yet it's hardly ever tested by the primary care physicians unless they're seeing a spinal cord specialist. Year five mortality rate for pneumonia, is 19 times normal with people without spinal cord injury. That's unbelievable.

Dr. Steven Kirshblum:

It's preventive bladder care, appropriate monitoring for metabolic syndrome. These are just some examples. Heart disease is also critically important. When we look at 35 and 40 year olds, people aren't always that concerned about having heart attacks or stroke. But the risk of stroke and heart attack are greatly increased in people with spinal cord injury, because they're at more risk for metabolic syndrome. So, so much can be done more for these people if we could just make sure that they get the right follow up and long term care.

Dr. Maxwell Boakye:

But the fundamental issue though, is most of the primary care. So should patients be periodically going to rehab centers? Or should primary care taking care of these people be getting some additional training? Most of these patients will be taken care of by primary care physicians in the community. How do you ensure that they are really sensitized to some of the issues, like the sleep apnea and all of that in these patients?

Dr. Steven Kirshblum:

So it's a combination, I would say, of both of the possibilities you gave. And what I mean by both is one, greater education. The spinal cord field, the spinal cord specialists need to do a better job of reaching out to the primary care physicians and communities across the country, and across the world. To let them know about the medical issues that can occur specific in this patient population.

Dr. Steven Kirshblum:

And the flip side of that, is that primary care physicians should be reaching out to their spinal cord specialists in their neighborhood and say, "Can you follow the patient with me?" Always, the primary care physician when the patient has severe seizures, will reach out to the neurologist. When they have significant dermatologic problems, will reach out to the dermatologist. I'm hoping that the day comes that they recognize that when they have a patient with spinal cord injury, they'll reach out to the spinal cord specialist as well and say, "Let's team up together in working on our patients."

Dr. Maxwell Boakye:

People do know about cardiologists and neurologists, right? I'm not sure that it's well known that there's a specialty field of spinal cord specialist that it could refer to. I may be wrong, but it's my suspicion that more education needs to be made regarding that. Right?

Dr. Steven Kirshblum:

You're absolutely correct. And I think that it's something that as a field, we're not a very large field, but as a field, we need to do a better job at making sure that people understand the value that we bring to medicine. And to the patients and their family.

Dr. Maxwell Boakye:

Yeah, definitely. Let me ask you about, we talked about steroids. And for the longest time, it was the only pharmacological treatment. It was introduced in the eighties, and now it's falling out of favor. In fact, the neurosurgery guidelines do not really recommend it as a standard of care. But what are your thoughts about why many successful clinical trials in the laboratory has failed to be translated into humans?

Dr. Steven Kirshblum:

It's such an interesting question. Because the issue of difficulties with translational research, then being translated and successful in humans is not limited only to spinal cord injury. But we certainly have experienced it in our field. And steroids is just one perfect example. And part of this is, now I'm giving you opinion. Although obviously it's all opinion, but I have an opinion on this that I think it's partially because of the small animal model that's been used, the rat for instance. There's just differences in the central nervous system relative to the human, the size of the spine to brain ratio, where the tracts are even located in the spinal cord. And also when studying animal models, these animals are on a controlled trial and they all share the same attributes, the same age sex and medical issues. And the lesions that are caused in the animal models are exactly the same. Humans, not so.

Dr. Steven Kirshblum:

People who are injured are of different ages, they're different sexes, have different medical comorbidities. Some have diabetes, and hypertension, and cardiac disease. And others don't. And perhaps most importantly, they all have different severities of injury. So we don't even know exactly, and even though we have the Asian impairment scale, it's not perfect. And MRI certainly isn't perfect either. Also what's important in humans, is that they have different levels of resilience. Family supports, settings that they go to after the initial injury, all of which can play a really important role.

Dr. Steven Kirshblum:

Now, nonetheless, I don't want to paint a negative picture only. I think that there are positive trends as well. Including I'll mention one, of the work of Jerry Silver from the animal model that's now coming to clinical trials. But also positive is that people are studying larger animal model studies, the pig model for instance, that may prove to have a much better translational success. And hopefully we'll know in the near future whether this will give us a better, let's say, batting average than we have had in the past.

Dr. Maxwell Boakye:

Speaking of resilience, I want to touch on a couple of topics. Resilience of patients. How do patients develop resilience to handle the cognitive aspects? And then the flip side of that, is how do providers taking care of spinal cord injury, develop their own resilience to manage a SCI on a chronic basis?

Dr. Steven Kirshblum:

Yeah. Boy, I'll tell you that that, it's so important. So I will say first in terms of cognitive issues, let me just take a moment to speak about that. Cognitive issues are a problem in spinal cord injury. We sometimes think of the spinal cord injury as, "Well but it's not the brain, it's the spinal cord." And as I mentioned earlier, a large percentage of people with traumatic spinal cord injury also have cognitive deficits. And so there's really amazing work that's going on now within the field. And we are doing some work also to look at these cognitive aspects that's happening. But in terms of resilience, I think resilience is often innate in people. Although there are a number of things that certainly play a role as well. Things like family and community support, education, understanding, religious beliefs.

Dr. Steven Kirshblum:

All of these have really played a role, and there's some really good work on how the resilience itself helps people handle just not only the cognitive aspect, but just dealing with spinal cord injury itself. And

I hope that there'll be some more work. In terms of providers, I'll tell you that it's such an interesting question. And if I were to think of a one word answer, it could be experience. I think from a personal standpoint, I've developed resilience in managing spinal cord injury because you learn from your patients and their families. I've been so blessed to be able to follow some patients for decades. It's the reason I went into this field, is to be able to follow people throughout their lifespan. And I believe you gain strength from their strength. Truly I have gained my resilience, I believe, from experiencing the triumph of the human spirit on a constant and consistent basis. And that's why even with all my jobs that you mentioned that I have, I still don't want to give up seeing patients. Because that's really where the energy stems from.

Dr. Maxwell Boakye:

Let's talk about a bladder, let's talk about it. I've seen patients who are on intermittent catheterization, and then some get suprapubic. How are we currently managing bladder? That's obviously one of the most important functions that is affected in spinal cord injury. How are we currently? Used to be, I thought everybody had a Foley catheter for a long time. What is the current thinking on bladder management, and have we made progress?

Dr. Steven Kirshblum:

So I'm seeing the time, so I will make sure to give quick quicker answers. So no doubt that there has been a tremendous improvement in bladder management. When you think about it in the 1970s, renal failure was the number one cause of death in spinal cord injury. But because of better bladder management over the course of time, this has really decreased. Now there has been a real push lately to remove indwelling catheters as soon as possible. Sometimes, I believe it's a little too early, as the patient still requires significant fluids. And the ability to keep up with catheterization program could be difficult, especially in these last two years of COVID when there are shortages of staff at many places. Nonetheless, removing a catheter for many people early on can decrease the risk of UTIs. So we try to get people on intermittent catheterization if they can handle it.

Dr. Steven Kirshblum:

But there are some people who benefit from long term indwelling catheters, including those individuals who have significant fluid leads for blood pressure management, as an example. And sometimes you need that for long term, not just for short term. Or they have high levels, such that they don't have the hand function to perform catheterization independently. And it's not so easy to get help all the time to be able to do the catheterizations. At our centers, and at my center itself, we recommend suprapubic catheters in these circumstances. Even early on if believe that the person most likely will need long term indwelling catheter. As they have many other benefits relative to the indwelling Foley, it's easier to change, it doesn't interfere with sexuality. Less chance of penile breakdown in males, and others. So it really is, someone really should follow up with experts in that, to give them the best mode of treatment for their bladder to keep them safe for the short term and long term.

Dr. Maxwell Boakye:

This is great. A couple of more questions for you, Dr. Kirshblum. At the University of Louisville, we've been heavily involved in epidural stimulation, and other neuromodulatory research. Do you see neuromodulation evolving into an FDA approved treatment in the next five or 10 years? And eventually making it into the armamentarium of treatments for SCI? And a second question is, how best do you

evaluate the impact of such new treatments? What are some of the best outcome measures to be looking at?

Dr. Steven Kirshblum:

Okay. A really really great, such a hot question that's going on these days and somewhat a tough question to answer, but let me try to tackle it. We definitely have seen with neuromodulation, and obviously, hopefully people know that you're leading the field, you and your center, in this. And there are case reports in case series about the impact of spinal stimulation, transcutaneous, epidural, on movement and other aspects for people with spinal cord injury. I want to take a step back though for a second and say this, after a spinal cord injury the ability to find some treatment to regain voluntary movement of an arm or a leg, is really amazing. But it's not enough. It's something and I'm not minimizing it, but we have to find ways that will impact some of the other deficits that affect people with spinal cord injury. Like their neurogenic bowel, their bladder, their sexuality, the ability to maintain their blood pressure within normal range. To improve their breathing, their cognition, decreasing their level of pain and spasticity.

Dr. Steven Kirshblum:

And these are things that are known as invisible or hidden disabilities of spinal cord injury. Blacking out, dizziness, loss of concentration, fatigue. Patient states that sometimes they wake up and have symptoms of the flu without the sneezing and coughing, and it takes them hours in the day to get into their groove. And there is no consistent treatment that manages the myriad of issues that these people have. So I do believe in terms of what I'm seeing from neuro neuromodulation, sometimes we hear about that neuromodulation can help a person move an arm or a leg. But the reason I said it's not enough is that there's so many issues that we need to work with. And one of the great hopes regarding neuromodulation is that it could impact more than just the movement. It could impact all of these other things that I mentioned, which would be of such unbelievable benefit to the patient.

Dr. Steven Kirshblum:

So do I believe that it will be part of the armamentarium of treatments in five years? I don't know, I sure hope so. But I'm concerned though that people will move too fast and take a case report, or take some thoughts about it and declare that just putting in a stimulator without truly understanding the nuances of the research that is involved, that this can have a negative impact on the potential future of this technology. So I have tremendous optimism that studied the right way, given time to study the right way, that progress we made in this field.

Dr. Steven Kirshblum:

In terms of outcome measures, I think that I listed probably a litany of so many different domains that we could be studying. Obviously going to the FDA and saying, "We're going to study. We have 17 primary outcome measures." You'll be laughed at. So I think that we need to come up with some primary outcome measures, and then slowly but surely tackle them. But there are good outcome measures, or fairly good, for most of these problems. And patient reported outcomes, PRO's are becoming more and more important. So we need qualitative data, and the quantitative data to be able to get it approved. And hopefully safe at the same time as well.

Dr. Maxwell Boakye:

And speaking of neuromodulation, the Zurich Group by Cortine I think last week published their findings in nature medicine. Which confirmed our own findings that we published in The New England Journal of Medicine, and has been in the news lately. So definitely a very hot area, and one of the most promising for spinal cord injury. Let me ask you a final question. And this is a question that I always ask all of my guests. It's my magic wand question. So if you had a magic wand, what would you do with it for SCI care?

Dr. Steven Kirshblum:

Wow. So if only, right? If we only had the magic wand. So I think two things will come to mind. First from the clinician perspective, in terms of improving care for people with spinal cord injury, I personally think that the secret of the care of the patient with spinal cord injury or any other patient if you will, is in caring for the patient. I sometimes see and hear about people who are so into innovation and technology, perhaps forgetting that there's a person we are working with. Who's experiencing much more than simply the inability to move their arms or legs. So I would want to wave that wand and have people truly understand the importance and value of rehabilitation.

Dr. Steven Kirshblum:

Rehab in Latin is to rebuild, or make able. And moving people so quickly through the process, prescribing medications and assist devices, this is not enough to help people. And enhance their quality of life. Whether it be spinal cord injury, or other disabilities. I believe most of us would want our loved ones to be treated with empathy, as opposed to just efficiently. Which seems to be part of what happens today. And from the research perspective, I would want to open the window of sharing knowledge, and know how across scientists and clinicians across the world. Unlike perhaps power or wealth, sharing doesn't diminish our knowledge. But it enhances it, or strengthens it. So I hope with this one, we can soon get there as it will certainly bring the ultimate gains in clinical care we all endeavor for, closer to reality.

Dr. Maxwell Boakye:

That is really awesome. It's really, truly great. As I mentioned before, we'll be bringing Dr. Kirshblum back for part two, to talk about racial and ethnic disparities in SCI care. But Dr. Kirshblum I want to thank you so much for this really terrific and fascinating conversation about the state of SCI care. I know we didn't cover everything, but we covered some really key aspects of SCI. Thank you for bringing us up to date, very much terrific. Thank you.

Dr. Steven Kirshblum:

Thank you so much for the invitation and wishing you and your listeners the very best.

Dr. Maxwell Boakye:

Thanks.

Speaker 1:

Thanks for listening to Optimal neuro/spine podcast with Dr. Max Boakye. If you enjoyed this episode, we hope you share it with others. Leave us positive reviews on social media, or leave a rating and review on iTunes. Check out our website, maxwellboakye.com/podcasts for show transcripts and other information. Join us next time for another edition of Optimal neuro/spine show.