Transcript

SNIMC # 203:

Benefits of Hand Surgery on Special Needs Children with Cerebral Palsy,
Interview with Shriners Surgeon, Jon Davids, M.D.
November 18, 2015

specialneedsinmycity.com

Meena: Hi Everyone, Welcome back to another episode of specialneedsinmycity podcast, a podcast devoted to parents and professionals managing children with special needs. I am Meena Tadimeti. For parents, it's tough to watch our children attempt to pick up, twist or turn objects with great difficulty when performing daily tasks with their hands ?

So we asked internationally recognized pediatric orthopedic surgeon Dr. Jon Davids with Shriners Hospitals for Children Northern California to help us better understand hand disorders and answer questions and concerns facing parents managing children with hand difficulties.
Dr. Davids is an Assistant Chief of Orthopedics and the Director of Motion Analysis Lab at Shriners. He is also a Professor of Orthopedics at UC Davis Medical School and appointed the Ben Ali Chair of Pediatric Orthopedics at UC Davis Medical School. Dr. Davids earned his Doctor of Medicine at Harvard University and is highly recognized for his work in treating children with cerebral palsy.

Good Morning Dr. Davids.

Dr. Davids: Hi, Meena.

Meena: Some of you may know Dr. Davids from our podcast interview earlier this year, titled "What Every Parent Ought to Know about Cerebral Palsy". We've had many requests from parents to have Dr. Davids back on again, this time answering questions on hand disorders in children with special needs.
We are certainly very fortunate to have him here today , given his busy work schedule and for willing to share his vast knowledge and expertise in treating children with hand disorders. So, we do appreciate your time.

Dr. Davids: It is my pleasure, thank you.

Meena: By the way, if you are a parent and would like to listen to that podcast that we

broadcasted several months ago, you can find it on our website or in the ITunes store by typing specialneedsinmycity in their search box. I understand from our team that this particular podcast gets downloaded daily and is one of our popular podcasts, so be sure to check that out!

Before we jump into the questions submitted by our parents and therapists, particularly occupational therapists who work with children with hand disorders.

If you would Doctor, share with us a little bit about yourself and how long have you been treating children with CP and performing hand surgeries.

Dr. Davids: Well, Meena I am a pediatric orthopedic surgeon and I have had special training in caring for children with cerebral palsy and then a special interest throughout my career which is about 25 years at this point. The upper extremity historically has gotten less attention than the lower extremity in children with cerebral palsy but that's not because there are not things that we can't do or that it's not important ..just... for a variety of reasons there has been less focus, But in my experience with the properly selected child, many good things can happen with the proper surgery, the proper therapy, and the proper splints and braces afterwards. So, I am very enthusiastic about hand and upper extremity for children with CP .

Meena: Well, thank you for sharing that. And as you know, we have several questions for you some that are medical related, some that are related from parents' perspective, and some from our occupational therapists.

Let's begin.

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Our first question to you is since a number of different disorders may affect the hand or fingers, what are some common types of hand disorders you treat as an orthopedic surgeon in children with CP?

Dr. Davids: Well, if we consider the whole upper extremity and start at the shoulder and work our way down to the fingers... at the shoulder, children with CP may hold the shoulder tight into their trunk and rotated internally. This is rarely of great functional significance and at the most we treat this with Botox injections into the muscles that are pulling the shoulder in and that is followed by physical therapy for stretching. That is pretty infrequent but that can happen.

At the elbow, the primary problem is that the elbow is held bent or flexed and can't straighten out all the way and in some number of kids when they get excited or are doing activities where they are concentrating, the elbow may bend up even further. We treat this with again Botox injections and stretch casting and in a small number of cases surgery to lengthen or relax the muscles that cause the elbow to bend. When we offer all of these treatments , they can make the elbow better but it is really not possible to get the arm to straighten out all the way. However, if the posturing is less and we can get the child to within 30 degrees of full elbow extension that tends to meet all of their functional needs and everybody is happy.

In the forearm, the segment tends to be rotated internally which puts the child's hand facing towards the floor. This can get in the way of bi- manual or two handed activities or using the hand for feeding or doing anything to the face or head. Again Botox in some cases can be used to relax the muscles that are overactive. Additionally there are some very well prescribed surgeries that are designed to improve the ability to rotate the arms of the palm, that is facing up.

Wrist deformities are very very common and are of great functional significance in almost all cases . The children's wrist is held bent forward and turned away from the thumb. We call that volar flexion and ulnar deviation. There are variety of exercises,

splints, Botox and then surgeries on the muscles, tendons, and then surgeries on the bone that are designed to improve wrist position.

Improved wrist position has cosmetic benefits and it also has hygiene and quality of life benefits in terms of being easier to put on shirts, sweaters , jackets...easier to keep things clean if the hand is very tightly or if the wrist is tightly flexed and then it can also be functional significance. After improving wrist position, the child's hand frequently functions has a better helper hand particularly when doing two handed activities. And in some cases, it can actually function more independently on its own after the wrist position has been corrected.

At the fingers, the most common deformity is that it's not possible to straighten the fingers out all the way and this is due to over-activity or tightness of the muscles in the forearm that bend the fingers and this can be addressed in the number of ways again with stretching and splints, Botox and in more extreme cases surgery to lengthen the muscles that bend the fingers. Unfortunately, anytime we lengthen these muscles surgically we weaken them and that can cause some problems with the ability to grasp.

The thumb has a variety of deformities. The one that is the most significant is where the thumb is in the palm that makes it difficult to put something in the hand for it to hold and the thumb gets in the way of the fingers when they bend for grasp. There are a variety of splints that are used to control thumb position; Botox can be helpful in relaxing the muscles that are pulling the thumb into the palm and then there are some very elegant surgeries that are done to improve resting and dynamic positioning of the thumb.

The challenges are to figure out which of these problems are present, which ones are actually a functionally significance, and which ones can you realistically improve with any of these interventions. The area that I focus on the most which is the surgery involves identifying all of the problems and addressing them at a single surgery. This requires pretty sophisticated decision making. The surgery is more complex and then finally the rehab which is usually under the guidance or is performed by an occupational therapist

is more complex is as well. The occupational therapist needs to have special training and support from the Center that did the surgery. Our decision making for the upper extremity is not quite as sophisticated as for the lower extremities.

In our previous talk, we talked about using gait analysis and computers to objectively measure how we walk. For the upper extremity we don't have the computer technology but we do have a test that involves video taping the child using their hand in a variety of specifically selected tasks and from that video, we can score the function of the arm in that child and then use that information to guide us to recommend treatments and then use that information to measure the outcome after the treatment. The test we use is called the Shriners Hospitals Upper Extremity Evaluation. It has been published and validated in the medical literature. It is used all over the world. The test has been translated into five different languages and is used in something like 25 different countries that we are aware of, all around the world.

Meena: In general, for hand surgeons, what part of the hand surgery is the most difficult? Is the assessment part? Is it the decision-making of whether to do the surgery or is it the selecting what the procedure is the most effective? Or the actual surgery which is obviously very complex?

Dr. Davids: That is a great question. Three things come to mind. At the start, the most difficult part is figuring out which of the problems should be addressed. And then if you have identified the problem is being significant what is the best operation for that. The decision making is very involved at the wrist because the position of the wrist impacts the position of the fingers. And if one fails to appreciate the connections between those two, it is conceivable that you could do surgery that would improve wrist position but actually make it harder for the fingers to work. In which case, you may have actually made the child worse off with the surgery which is something obviously we never want to do. So, whenever we are contemplating anything at the wrist, we are looking very carefully at the fingers as well.
And then finally, the thumb is probably most complex of all the segments that we operate on. There are some very elegant operations but normal thumb function is really

remarkable and restoring that to some degree is controversial.

Meena: We take it for granted right, the functionality of our fingers and what they do for us and not realizing what it takes to make that finger fold and manipulate things and objects.

Dr. Davids: That's true. It's helpful to sort of contrast the hand to the foot. The foot is very complex as well. But the foot performs what we call gross motor function which means that it is sort of about gross alignment, stability and strength. The hand also does gross motor function but on top of it the hand also does fine motor function which is what you were sort of referring to. It is so amazing our sense of feel, and how we can know where everything is in space and how we can use our fingers to manipulate small objects in a very precise fashion. And it's really my experience that what we offer with Botox or casting or splinting or orthopedics surgery may improve the gross motor function of the hand, but it rarely ever improves fine motor function of the hand.

Meena: Interesting. Ok

Dr. Davids: Yeah, so the hand, we can make the hand the better helper hand in many many cases. But to get it to really function independently at its highest level, usually is impossible. Now, fortunately, many of the children who we treat have CP involving only half of their body and their other hand works very well. So making the affected hand a helper hand , a better helper hand combined with the un-involved or typically developed side can be a great benefit to the child.

Meena: When my child is not able to hold on to scissors or hold an object, I have to think how do I hold that object or how do I manipulate the object so that I can teach her which fingers go where and to position those fingers to help her. So we kinda of take that for granted.

Dr. Davids: Yes you do.

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Meena: If there is level of motor planning issues, the surgery doesn't remove that piece right... Am I correct?

Dr. Davids: Yeah, I think for the most part that is. And that really is partly what I was trying to describe when I made the distinction between gross motor function and finer motor function. And higher level finer functions are comprised by Cerebral Palsy and really are not addressed by surgery...for instance that deals with muscles, tendons that are too short or too tight or bones that are poorly aligned.

Meena: All right, now, when a family comes to you with their child that has lost significant functionality in his hands. What is the sequence of events that takes place before and after surgery? If you would walk through that process a little bit.

Dr. Davids: Well, we certainly don't analyze the hand by itself. So, we look at the whole child and the first thing we do is categorize the child by the gross motor function classification system (GMFCS) because that guides us into what treatments are appropriate. So, at the higher functioning GMFCS levels, particularly in children with the hemiplegic type of CP, we will focus pretty heavily on the hands, on the hand that is involved. A child with diplegic CP typically is not going to have hand troubles . And then at the more impaired GMFCS levels, those children typically have involvement of both hands and we're focused less on function but more on hygiene, pain management, quality of life type of issues. So that's the first level of analysis. If we are looking at the hemiplegic who is more highly functional , in the early years up to probably about age 5 we focus primarily on occupational therapy and orthotics. Probably, about 4 to 6 or 7, we might add Botox into the mix to relax muscles that are overactive and starting about age 7 and going well into the teenage years is when we can certainly perform surgery with predictable results . There is a limited role for Botox in the 4-8 years, after that there might be soft tissues surgeries to lengthen a release structure that are too short or tight.

And in the teenage years, generally we favor fusion strategies like wrist fusion or thumb fusion to improve alignment of the hand and wrist...primarily for cosmesis, hygiene and

quality of life issues. The evaluation process regardless of the child's impairment and regardless really of which intervention that we're thinking about needs to be systematic and comprehensive. And the commitment to figuring out what to do is only part of it. We also have to be committed to measuring the outcome after we do it to see if we really achieved what we set out to do. The family has to clearly understand what are reasonable goals or expectations for the surgeries. And then particularly for the surgeries that are designed to improve function, we have to have significant rehab under the direction of an occupational therapist lined up before considering the surgery. The surgery by itself does~~n't~~ not give you nearly as good a result as surgery followed by appropriate rehabilitation.

Meena: When you're considering surgery what traits are necessary in the child and obviously with the family to have those better outcomes after surgery?

Dr. Davids: If it's surgery to improve function, the child needs to be motivated to actually use the hand. If for instance, they completely ignore the hand in function then chances are the results are not going to be good as the child who is actually trying to use the hand but can't use it effectively because of poor position or alignment. In the past we focused very heavily on do they have sensation or other elements that you would appreciate on a neurologic exam. I think that those are all reasonable parameters but I don't think there really the ultimate variable. The ultimate variable is whether they actually spontaneously use it or not. And all these other intermediate variables affect that. And so the evaluation that we do has 2 levels. The first level is we just watch the child perform by manual tasks. And if they are spontaneously using the hand that's a good sign, if they are ignoring it, that's a bad sign. Then we specifically ask them to use the affected extremity for selected tasks to see what they are capable of and to identify what specific problem might be blocking their function. And that guides us towards the specific surgeries that we might do.

Meena: I see. Once the decision to do hand surgery is established, what are you looking for in terms of goals and improvements with such a complex surgery on a child with CP? Obviously you touched on the functionality aspect and the goals and improvements

might vary depending on the degree of the disability or the limited use of the hands. But in general , what are those goals and improvements that you as a surgeon are looking for?

Dr. Davids: So... better position at rest, better function as a helper hand, better ability to hold an object that is placed into the hand. And then at the highest level, better ability to manipulate an object independently with that hand. Now, cosemesis is a very important element of the upper extremity that is a little bit different than the lower extremity. In our western cultures, the parts of the body that are never really covered up are the face and the hands that is what people see and if the child is cognitively, intellectually normal, and is fairly highly functional but their hand is poorly positioned particularly if it's the hand that they might use to shake or greet somebody that can have a lot of consequences for their self-esteem and how other people look at them. So, in a situation like that, an operation that simply makes the hand look better even if it really doesn't function better, can still be of great benefit to the child and so we don't discount the significance of the cosmetic improvement for the hand in children with CP.

Meena: Ok , is there an ideal age that you would consider hand surgery in children?

Dr. Davids: There is. Certainly because hand function is complex and the rehab following these surgeries is complex. The child needs to be able to work with an occupational therapist and so usually that's not really possible until 6-or 7. So, it's not like we do nothing in the years before that. But we don't do any of the very aggressive intervention until that age and well into the teenage years, we can do a number of these operations and get a good result. It's a little broader window of opportunity for the upper extremity than for the lower extremity.

Meena: I see, how young a child have you done wrist or hand surgery on?

Dr. Davids: Well, there is the rare situation where at age 4 or 5, we would do it. And I just can't imagine ever having to do it younger but even 4 or 5 is young. I'd rather it be seven or eight and above.

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Meena: I see. When you are actually are doing the surgery, do you perform several types of procedures on the hand at the same time or do you prefer to do one type of surgery at a time and why?

Dr. Davids: We prefer to do multiple surgeries all at the same time. As I alluded to earlier, we understand the complex relationship between the wrist and the fingers and so all of those elements need to be addressed at the same time. And technically it's a little more involved to do all the surgeries at the same time. But the real challenge is the rehab that follows multiple surgeries that are done simultaneously. However, we know that the rehab is possible. And when everything is done properly, we can accomplish in one surgery, one recovery, and one rehab that would otherwise might take 3 or 4 rounds.

Meena: Ok, are there surgeons that prefer to do couple of different things all at one time?

Dr. Davids: Yes, what I am describing really represents the most sort of advanced approach to this. The historical approach was to do one thing , see the consequences and move on to the next thing. And, I certainly like to see us get past that and any Center that has surgeons that have high volume experience and where they really look carefully at their outcomes have all embraced this single event multilevel surgery approach to the upper extremity.

Meena: Interesting. Let's do this. Let's take a break, we will be right back.
Dr. Davids: Ok.

Meena: All right. Welcome back. Today we here with Dr. Davids, a pediatric orthopedic surgeon with Shriners Hospitals for Children in Sacramento. We are grateful to him for answering questions from parents and therapists whose children have special needs particularly trouble using their hands. Now, let's now turn to questions that have to do with concerns and issues from parents. And the first question that our parents have for Dr. Davids is...

Meena: Is their a particular hand test that I should request with my child's pediatrician to

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see if hand surgery is appropriate, given his functional disability? And I know that you have touched on the test that Shriners uses but I am wondering if the parent here is thinking is there a more of a general one at the initial stages of assessment?

Dr. Davids: That is a good question. There are a number of tests that can be done to assess function and impairment and even establish prognosis for hand function in children with Cerebral Palsy. These are very specialized tests that are performed either by an occupational therapist or by a physician. And the physicians would most likely be orthopedic surgeons, maybe a plastic surgeon in some centers. Maybe a rehab doctor in some Centers. It would be very unusual for a pediatrician who covers so many different other elements of a child's health to have the ability to perform these tests. So if there is an issue, the family shouldn't really expect the pediatrician to be able to offer them the assessment; but the pediatrician certainly could make the referral to the orthopedic surgeon or the occupational therapist. And either of those two are really the ones who would give the best quality assessment.

Meena: There was a question which was somewhat difficult to make out. The question is: is the spacisity in the hand due to muscle or joint contracture?

Dr. Davids: Well, in a way it can be due to both. Clearly spasticity which is an exaggerated response of a muscle to being stretched. If it exists overtime in the child who is growing will cause that muscle to not grow properly and become too short and that is a muscle contracture. So, muscle contractures or shortness tightness of muscles definitely contributes to impairment in the hand. Similarly, there can be deformities of the joints where the joints loose range of motion or the cartilage wears out in the joint prematurely resulting in pain and those problems can also compromise function. So, part of the global assessment is to figure out which of these elements are present and then address all the ones can be addressed at the same time.

Meena: I see. I am going to throw out to you a question that you and I talked about. But I'd like have other parents listen to it and that has to do with a question that came in.

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If the hand is under anesthesia, doesn't it become more difficult to perform the surgery because visually it looks fine?

Dr. Davids: That's a good question. In some cases, once the child is asleep the hand does indeed relax completely and appears to be fairly normal in terms of at rest. But the whole point of doing the comprehensive functional assessment before surgery is to figure out what to do. And a child who for instance when they are awake, their wrist is always bent in a certain position. But when they are asleep that problem goes away. That child might be an excellent candidate for a tendon transfer that moves a tendon from one part of the wrist to the other so that when the child wakes up and that tendon is firing at the wrong time instead of putting the wrist into a bad position because of the transfer, the muscle now improves the position of the wrist.

In other situations, there are fixed deformities that are present even when the child is asleep and that is valuable to know as well because for instance if you're have a deformity when you are awake and you have the same deformity when you're asleep. Generally, doing a tendon transfer doesn't not correct that. So the information that we get combining the exam awake with the exam asleep is very helpful in guiding us to figure out what to do.

Meena: Very interesting....from the parents standpoint of submitting that question and hearing what you have to say that evaluating even at sleep time helps to determine the wakeful time as well. All right. Let's touch few more questions. And these questions are coming from our occupational therapists who day in day out work with children with hand disorders. The first question is... How often do you perform wrist/hand surgeries for better position versus better function?

Dr. Davids: That's a good question. We alluded to this or covered this a little bit earlier. Sometimes better position results in better function. Sometimes better position results in better hygiene, and sometimes better position results in better cosemisis. All of those are important. So we're always trying to improve position and we think by our pre-

operative assessment, we can determine who is going to benefit in and what way are they are going to benefit from better position. The therapist may also be making the distinction between surgery that just puts the hand in a better place and surgery that allows the hand to function better and again we do surgeries for all of those situations with all of those goals and the real challenge is figuring out which surgery for which kid and which goals are realistic. And again, centers that have a lot of experience doing this who are committed to objectively measuring where the child is before the intervention and where they are after intervention are the ones that are the best at figuring out who needs what and that translates to generally better outcomes.

Meena: Ok, Is it more difficult to treat a spastic hand than a hand that is paralyzed? Why?

Dr. Davids: Yeah, the question could be interpreted in a couple of different ways. A child who for instance has had a spinal cord injury is going to have a hand that is paralyzed which means that it loosen , floppy and doesn't move on its own. But it doesn't have tightness. And there are a whole set of interventions for that. On the other hand, the child with CP, their hand is not going to be loose and floppy. It's going to be tight. And the tight hand has more elements to address than just the hand that is loose. On the other hand, the possibilities of improvements are present in both kinds of deformities. And so it's important not to use rules and principles from one group of disorders to try to figure out what to do for the other. So, really again we're back to... if you have these complicated problems, you need to be evaluated at centers that have experience and know what to look, what interventions makes sense and have the resources to do them properly.

Meena: Ok, Well those are the list of questions we had for you today. Outside of these questions, is there you..like to share overall regarding hand disorders?

Dr. Davids: I'll reiterate that it's an area that has been in a relative sense neglected. And for the properly selected child, with the proper surgery and the proper rehab. some very predictable results can be obtained. And the children and their families in my experience, have been very pleased with all the different kinds of improvements that can

be made; be they cosmetic, hygiene , quality of life or functional. It is a wonderful area, it's part of my practice that I really enjoy . And I hope through the course of my career that I see more and more people recognizing that this an area that deserves more energy and attention.

Meena: I know that we covered a broad range of questions so far, that's for sure. On behalf of all the parents and therapists who submitted their questions, thank you very much for taking the time to help us parents better understand hand disorders and obviously surgery and more importantly for sharing your knowledge and expertise with our families not just in the Central Valley California region but around the globe. Thank you so much for your time for being with us today.

Dr. Davids: Well, It's my pleasure Meena. Thank you for the work you do getting all this information out to those who need it.

Meena: Thank you.

Well folks that concludes the interview with Dr. Davids,. Don't forget, if you're a parent or caregiver and would like to join other amazing special parents, you can do so on our website or just text us to 33444 with the word **specialparents** (all one word, no spaces) in the message area and that will get you started! If you have a story you want to share as a special parent, just email us at specialneedsinmycity@gmail.com.

Thank you for joining us today! I'm Meena Tadimeti with specialneedsinmycity.