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Empowered Patients, Efficient Practices: Surgery and Activation

**Presenters: Michael Harris, MD, Scott Brown, MD, Kristina Brendzel, AuD,
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Good morning. Good afternoon. Good evening. Hello everyone. My name is Lori Hambrick.

I'm the principal education specialist on the global education and training team at AB. First, I'd like to thank you for attending today's webinar. We're now on part three of the empowered patients Efficient Practices series. So far we've covered a lot of information during this series. We've addressed barriers to cochlear implantation and provided some ideas on ways to overcome those barriers.

We've also covered strategies to get the right patients into your CI clinics. We've discussed ideas on how to modify the follow up schedule for CI recipients to improve clinical efficiency. And last week we covered how utilizing the MSTB three and incorporating telehealth can improve your clinical efficiency. If you missed session one or two, you can access all of the webinars in this series with the registration link that was just shared in the chat. Today we have guests here with us who will discuss the next steps of the CI surgery and activation.

I'd like to begin by reviewing the goals and objectives for today's session. After today's course, you will be able identify one change that you could implement to improve clinical efficiency, explain the value of utilizing aim, and identify two ways in which ab staff can provide support to CI candidates at activation and beyond.

I'd like to ask our guests to turn on their cameras and introduce themselves today. Doctor Harris, would you like to start? Good morning, everyone. I'm Mike Harris. I'm a cochlear implant surgeon from Medical College of Wisconsin in Milwaukee, Wisconsin.

I'm chief of our division of neurotology and medical director for the Cost Cochlear implant program and the Milwaukee VA Cochlear Implant program. Thank you all for joining us. Thank you, Doctor Brown.
Hi. Hey everyone.

Good morning or afternoon or evening. As Laurie said, thanks for having me here today. I'm a neurotologist in Atlanta in a private practice, but I'm director of our cochlear implant program here at the Atlanta Institute for ENT. Thank you Doctor Brown. Doctor Brinzel.

Hi everyone. I'm Christina Brenzell. I am a clinical audiologist at Tampa Bay hearing Imbalance center in Tampa, Florida. I've been here for about 16 years now, working with cochlear implants and a lot of other things. Glad to be here.

Thank you all. And thank you all for being here today. Not only our presenters, but also those of you on the call as our learners today, I'd like to start today's discussion about surgery and activation with a polling question. The polling question should pop up on your screen. And our question today is, how much experience do you have with AB's aim system?

One, never heard of it. Two, I've heard of it, but my clinic doesn't use it yet. The middle option, my clinic uses aim in the OR only.

My clinic uses aim post op only. Or the last option, my clinic uses aim in the OR and post op. So go ahead and enter your answer. We'll give you a few more seconds to answer.

Okay, so now we'll take a look at the results.

Wow. We have a lot of variety on here. So it seems like the highest percentage is I've heard of Aim, but my clinic doesn't use it yet. Secondly, my clinic uses it in the OR. Kind of tied with that answer.

I've never heard of Aim. So we have a variety of answers on this poll, and it looks like a number of you may not be very familiar with Aim, which means you have a great learning opportunity today.

I'm going to start off by directing a question to you, Doctor Harris. You have a lot of experience with AB's AIM system. Will you explain what aim is and how you use it in the OR? Yeah. Thank you.

So the aim system is really a sort of something of a multi tool that I personally use in the OR. For AB cases, the features that I tend to use most consistently are the ECAP, the electrical compound action potential, or NRI, and impedance checks, which we do at the completion of a surgery. The most innovative piece, and the part that we'll get into a little bit in our part of the discussion is electrocochleography, or ECOG. And just on a practical note, what you see here on the right, this is the aim tablet. This presents a visual display for ECoG.

It's a waveform. There's also an auditory display that goes with it, so that if you're under the microscope doing surgery, you don't have to turn your attention to the screen itself.

The aim system, in terms of setup, the piece that's not shown here is tubing in an ear assembly with a series of domed ear fittings that deliver an acoustic stimulus for ecognitive. And then an assistant, a scrub technician, certainly an audiologist, sometimes, in my case, a resident that's with us can navigate us through the different steps to obtain NRI impedances in ECOG. Thank you for that very practical description. I appreciate it. You participated in a study that evaluated the benefits of Aim.

What surgical challenges did you experience that led to your interest in the AEM study?

Absolutely. So what I'm sharing here is an audiogram. And as indications have changed over time and as cochlear implant candidacy has broadened, this particular patient type is familiar to many of us.

Right. When we have somebody like this, whose speech perception is in the thirties, we absolutely know that they're going to do better or have a high likelihood of doing much better with a cochlear implant than they are with a hearing aid.

But we also want for them all the potential benefits of hearing preservation and of electroacoustic hearing.

These benefits may include better speech perception, better speech understanding in noisy, complex listening environments, enhanced music appreciation, something of constant sound awareness potential, and better overall cochlear implant specific quality of life, however. So the challenge really, the premise of our study of the clinical trial was that, in my opinion, the most crucial step of cochlear implant surgery, despite our best efforts, despite soft surgical technique, as we call it, the most critical step, really remains blind. And so as we insert the electrode into the cochlea, there's really no form of feedback, electrophysiologic or otherwise. We're really ultimately making an inference about what happens and the conditions within the cochlea during the electrode insertion from our outcomes, removed several weeks from the event based on our audiologic outcomes. This is really the environment into which I think ecog electrochococleography steps and where its really utility comes out.

And thank you for explaining the challenges you face. And based on what you just mentioned, where you feel like theres that crucial moment where you're conducting surgery essentially blind, how does ECOG help you in that case? Right. So just again, with a practical note, thinking back to the setup, what is eco electrocorphyr? For those of you that aren't as familiar or have to think back, you know, several years on this, we're presenting an acoustic stimulus, right, by way of that speaker, and we're stimulating any residual stimuli elements within the cochlea, the cochlear hair cells.

There is a signature electrophysiologic response that we see back, mostly reflecting the outer cochlear hair cell function, but also the cochlear nerve. ECog itself is not a new technology. It's actually been around for quite a long time without, without sort of a great application. But what's really where the novelty comes out and where the Ames system, I think by including it really stands out is that we can, for the first time, from the vantage point of the cochlear implant electrode, the apical electrode, we can

monitor the electrophysiologic response from those hair cells in the nerve. So in that sense, it serves to reflect the health of the cochlear hair cells and the nerve.

We can also importantly detect trauma, insertional trauma, potentially, and make some important predictions about future hearing outcomes.

This is critical because, again, we're making inferences and predictions right there and then at the time of surgery about what we'll see several weeks and at the time of activation and beyond.

Okay, thank you. One of the things that you are showing on the slide here is that there is this knowledge gap that was identified that you wanted to address during the investigation. So we're looking at the difference between the, or the association between that intraoperative ECoG amplitude and the structure and hearing preservation during surgery. So will you share some information about the protocol? Yeah, absolutely.

Right. So this is the knowledge gap that we're approaching with our multi institutional study. Again, it's the. Specifically, we were zeroing in on some of the ECoG parameters, particularly the amplitude. So the waveforms and the overall pattern that we see, what can we take from that?

That tells us valuable information about structural and potentially hearing preservation. So our expectations or hypotheses that we design this randomized prospective clinical trial to pursue were, first that we expected to see the insertion track pattern, which I'll elaborate on, and the amount of signal drop to have a direct relationship to our post op residual hearing. We also expected that we would see better electrode positioning with electrocochography on and available to the surgeons to guide decision making. So with those goals in mind, we design our study. And these are some of the parameters that we followed.

So, our sample was comprised of patients that met conventional clinical cochlear implant criteria specific to this study. We also really only wanted to include patients with some degree of potential low hearing, a low frequency hearing that we could preserve. So we define that fairly liberally as less than or equal to 80 decibels. Specifically at 500 hz.

Our participants, our patients had all used slim j or mid scale electrodes. The majority, however, were slim jenna. After all, these were patients that we were hoping to preserve hearing. And the ECOG response was based in response to a single tone at 500 hz alone, which is how the current system is configured. Importantly, our participants were then randomized.

They were randomly divided into two groups, one that had the ECoG's audible response on and available to the surgeon at the time of insertion to guide decision making, and then off, which represented standard of care, so it was still collected. ECOG was always recorded, but it wasn't played for the surgeon and the surgeon wasn't glimpsing the waveform either. Our two outcome measures were the scalar location, that is where the electrode ended up. And we determined that based on postoperative CT imaging with special processing and then hearing preservation. So looking at a pure tone audiometry CI only ear at the time of activation and at three months.

So for our what instructions our surgeons were given to, what could they do in response to ECoG feedback? They could modulate their speed of insertion, they could slow things down or speed up in response to what they were hearing. They could slightly adjust the angle or vector and introduce a slight amount of rotation or twist, potentially even retract by a contact or two if the signal was dropping in a moment. What we specifically instructed them against was partial insertion. So these were all complete full insertions to the second blue line and we didn't allow for something of incomplete or partial insertion here.

In total we had quite a large sample of 87 participants and this was made possible really through multi institutional and in fact international collaboration. So the sites that participated are shown here on the right, and 25 surgeons ultimately, and many, many more audiologists as part of that team as well, across nine clinical sites. And again, out of those 87, they were randomized, roughly split in half to those randomized ECoG on versus off. All right, so I'd like to share a little bit with our results. So if you're interested you can certainly learn more and I think we'll provide a link in the chat panel to access some of these papers.

But we've had two papers in otology neurotology in the last couple of years on our clinical trial results. I'll share with you some highlights. First, relates to structural preservation. Again, where did the electrode end up? Within the cochlea, 43 of our patients had post operative imaging that was sufficient to make this judgment, and translocations were then judged in a blinded fashion using merging the post operative scan with the preoperative scan to resolve a location.

In total of our sample, we identified three translocations. They all were within the ECoG off group and we didn't see any translocations in those participants who were randomized to ECoG on. We did see in terms of electrode types, two of those were with mid scale electrode and one was actually with the slump. Jenna.

So, moving from structure to function, what I'm sharing with you here is the relationship between hearing loss or hearing preservation as measured by low frequency pure tone average change. So pre implant to the time of activation, that's on the y axis. And on the x axis here is the ECoG drop, the change in signal or the drop from peak to trough that we saw at the time of surgery. What we're showing here is a direct relationship between these two. The larger the drop, the larger the hearing loss.

And there was no difference in electrode type for this. And a very similar set of findings observed a bit down the road at three months. Now, when we look at insertion track patterns, we see something really interesting and important. So what I'm sharing with you here on the bottom left, these are four common patterns that we see once the ECOG tracing is complete from beginning to end of electrode insertion. The first on the upper left we're calling type a.

And this shows where there's a steady climb in the signal over the course of insertion. We see that in about 20% of participants. On the bottom right we call type c. And this is where there's a climb in the signal, but then a precipitous drop that really does not return again to and ends up roughly at the baseline level. Contrasting that to the one above, we call that type CC.

And that also shows a drop, but a steady recovery in response, typically to manipulations of the electrode, but doesn't drop back down to the level of baseline. And then finally on the bottom left, that's really no response to the limit. Sorry, no response over the course of insertion. We call that type D. So those are, those are the patterns we see.

But what's most important on the right, what I'm sharing with you, there is a relationship between those insertion tract types and PTA change during preservation. What we're seeing, again, the type CC pattern that we believe represents recovery and response to ECoG driven manipulations shows less pta change that is better here in preservation compared to the type C pattern where there really is no rebound in the signal. Now, finally, when we take this and then look at how the two groups, the two arms in our study performed, we see significantly more of the type Cc pattern, which again is the recovery pattern in those that were randomized to Ecogeon compared to those that had the traditional standard of care approach that did not include ecoge through the AiM system.

So some kind of significance points and take home points on my particular portion is that I think these data really speak to the fact that the Ameco G system does give us an opportunity to improve structural

preservation. We see that through decreased translocations in our sample. We also see that there's an opportunity for better hearing preservation on the basis of more, and that statement's on the basis of more of these type cc patterns compared to type c, where the signal just does not recover. And ultimately, most importantly, what we're seeing in the, or the drops and the really, the drops in the signal correlate with what matters most to patients, which is postoperative hearing preservation.

Doctor Harris, thank you so much for sharing how beneficial ECOG can be for both you as a surgeon and also to patients when it's used during CI surgery. Thank you. I want to make sure to mention that aim can also be used clinically, and it can be used in a variety of ways. It can be used to conduct an ECOG audiogram that is a very fast way to get audiometric data. It can also be used to run objective measures such as NRI and ESRT.

And now that we've talked about surgery, I'd like to move on and talk about activation. And I'd like to begin this section with a polling question. What time frame does your clinic typically use for activation of the CI after surgery? One week or less. Between one and two weeks.

Between two and three weeks. Between three and four weeks or greater than four weeks. I'll give you a few moments to answer.

Okay, let's take a look at the results.

We have another pretty wide variety here. We do see that the majority of you that answered are seeing conducting activations between three and four weeks. Now, Doctor Brown is here today to share some information about activation. And I'd like to ask you to begin with sharing information about a survey that was conducted in 2023 that looked at the cochlear implant activation timeline. Thanks, Lori.

So our clinic was kind of interested in just kind of asking the same question that you just did to the participants here, just to get a better sense of differences in variability and maybe some of the rationale for that. So this is a semi annual survey that's distributed out to all ACIA members. And really we just wanted to get a sense of whether there were regional specific differences. We had found in some of our social media research and some of the larger cochlear implant experiencers groups that there was a lot of variability in that. This was a common topic and common question that people were bringing up.

And so we thought that we had a kind of a unique opportunity to maybe provide some answers to that question by actually asking surgeons and audiologists and even clinical administrators at some of these programs. And in doing that, we really wanted to look and determine what were the factors that kind of went into that, and we did find that. I'm going to go to the next one here. So we did find that most programs do have a set timeframe, right? So 85% or greater had a very specific set timeframe without any significant variability for that.

And similar to the polling questions that we just got here, the majority of these were greater than two weeks after surgery. And you can see our distribution there was pretty comparable, with only about 13% of our respondents having one week or less with that. And so because of that, we, we kind of sought some of those reasons and evaluations, and we'll get into that a little bit more. Thank you for reviewing that data. So here we can see that, like you said, the majority of the CI activations in the surgery in the survey that you conducted are occurring around two weeks or later.

And we saw in the poll that I just asked today's learners that we were looking at more like three or four weeks. So what prompted you to decide to incorporate early activations into your CI practice? Sure. So I've had some great mentors throughout the years always tell me to always ask the why as to why we're doing things and not just do things, because that's the way that we've always done things. And so, cochlear implant surgery, if you look back at how this was done in 1984 and then beyond in the early

nineties, and even at some centers still today, these were much larger incisions when the wells needed to be drilled down in order to secure the implant to the bone.

And so as a result of that, there was typically a lot of swelling. And I think the three to four or four to six week timeframe was just simply born out of feasibility of too much swelling and an inability to get the external processor to connect to the internal device. Where I trained Thomas Balkan, he had pioneered the sub periosteal pocket technique, which allowed us to do a much smaller incision. And so patients were sitting and waiting for a long time. And after reviewing our social media, we kind of set out to see to what limit we could push that shorter activation.

Additionally, we were seeing that some other centers, like Vanderbilt and Mayo Clinic in Rochester, were offering this complete cochlear implant care model, where patients who were traveling from longer distance were coming in, being evaluated, and having surgery, and even activation done, sometimes on the same day or the next day. With that in mind, we just thought, let's kind of implement this and see what works best.

So these are our why bothers, right? Patient feedback, care coordination, and neurotologists there's about 500 in the US, there's nine in Georgia. And so we have a pretty large catchment area. Patients are having to travel from long distances and just trying to coordinate that. And then as we kind of implemented this and progressed, we started seeing that some of our patients data was improving a little bit more quickly than we expected, at least based on some of the published literature.

And so we thought that there may be some associated improved outcomes with that as well.

So this is a pretty large Facebook group, which I would caution people sometimes there's some pretty horrible misinformation and outcomes there. But this is a frequently discussed topic, as I mentioned before, and you can see some of the comments that people have. Right. People almost went crazy

during the activation timeframe. It's emotionally overwhelming.

And while you know doctor Harris, his research speaks very highly to hearing preservation and maintenance of acoustic hearing in cochlear implant patients. The majority of ours still are profound hearing loss in one or both ears. And so if people do have residual hearing, and that goes down now, they're living at this place where they've lost the residual hearing in that ear, potentially. And that's just an overwhelming time period and timeframe than just waiting to have the device turned on.

The patient feedback you share on the screen is really powerful. And I've also heard many CI candidates express concern about that time between surgery and activation. Sometimes adults ask, how am I supposed to work during that time? And parents will ask, well, how can my child participate in school during that time between surgery and activation? Will you share what changes you made to incorporate early activation into your clinical protocol?

Of course. So our protocol was essentially our goal was just to reduce the timeframe between surgery and activation. And as I alluded to, a lot of this was based off of this complete cochlear implant care model that did show feasibility and safety, albeit in a small number of patients. And in doing so, we wanted to assess for any potential complications that may have arisen, whether it be swelling or pain that could result in an inability to activate, or whether or not patients were experiencing any worsened symptoms such as dizziness or vertigo at that timeframe.

So this data, I will say, is a little bit old. At the time we had submitted this at ACIA, and I just kept this data because it's what we have compiled for these outcomes here. We had 100 consecutive patients from August to January of 2023. And that's now, again, at the time of this was about 225 and now 250 patients. And we had an average activation time of about a week at 7.3 days.

We did have some very motivated patients who are interested and willing to come in the next day for activation. Had a pretty wide patient age range, obviously an average of about 56, but we were able to do this in our pediatric patients as well, including a bilateral eight month patient.

Thank you for sharing your very positive experience with these early activations. And we found that really, there were no complications related to the surgical site or to patient symptoms because I personally use internal stitches and steri strips over where there are no sutures or staples that need to come out. And we didn't have any patients that were unable to be activated at that time frame. We did have some with either larger scalps or with a little bit of swelling where we did have to use a stronger magnet initially. But because we had a subsequent three week or four week after surgery follow up, oftentimes that's when the magnet strength could be reduced to more appropriate.

And we really just kind of gathered subjective feedback from patients, and it was all unanimously positive. We didn't have anybody who was uncomfortable or displeased with the idea of coming in for that early activation, which we didn't really expect based off of, again, the sort of social media research that we had done. You mentioned potentially using a stronger magnet. What other tips do you have for clinics who are considering early activation? What can they do to increase success?

So there's a few different things to consider in order, I think, to implement this. As I alluded to earlier, with different surgical techniques, you really got to consider from the surgical side of things, reducing the size of the incision and still doing a successful surgery. As I alluded to, this technique from Doctor Balkany is a relatively small four centimeter less than a two inch incision, because the newer versions of cochlear implants have changed and they do not have as thick of a profile. It's a little bit of a larger surface area now, but not as thick. There's no need to drill the well, because this is going into that subperiosteal pocket that's held in place between the occipital lambdoid and tympanosquamous suture lines.

And so if you can identify that pocket during surgery, the implant fits very tightly into that. And there's been a lot of data showing that there's not mobility or movement of the implant thereafter. In doing this, it reduces swelling, and I think is what really allows this early activation. One of the other things that we wanted to be sure that we did was not waiting until the patient had the surgery to make these follow up appointments. And so we ensured that our activation was coordinated and scheduled at the time of surgery so that our audiologists were aware of that as well.

And you just mentioned that you schedule activation at the time of surgery scheduling. And in some centers, this may mean that changes that were previously mentioned during this webinar series by Doctor Hunter and Doctor Gifford may need to be implemented in order to improve clinical efficiency. And actually, a couple questions have come in on that topic. One is that early activation seems like a good idea from a patient perspective, but what changes do you suggest when access is an issue and appointment times just aren't available? Part of this is having dedicated cochlear implant times for our three cochlear implant audiologists who are here.

So I'm the sole neurologist in our practice. I'm the one doing all of our surgeries. We've got three phenomenal cochlear implant audiologists. Because my surgeries are either done on a Monday or Tuesday. We just are sure that on a Monday or Tuesday of the subsequent week that the clinical or cochlear audiologist has dedicated time set aside specifically for cochlear implant activations.

Thank you. And now that you've incorporated this early activation into your clinical practice, what are some of the benefits that you're seeing? So we actually were sort of lucky that after this survey and talk was submitted, that there was some data that came out. And so some of these benefits, we found that it is feasible and safe for patients of all ages, that patients themselves preferred this as the kind of questions was coming in and the opportunity to start auditory rehabilitation quickly, we removed the postoperative check. So when we first started this, I was seeing patients at a week after surgery to do

an incision check, and then they were coming in two weeks later.

And in consulting with some of my local colleagues and mentors, we really found that that was never changing our outcomes or changing our care. And so this really kind of consolidated a postoperative appointment. And if our audiologists have any concerns about the surgical site at the early activation appointment, they would simply text a Picture and call me and we could discuss that. But that happened in maybe two to three instances out of these 225. Thank you for that information.

And I think you addressed a question that just came through from Gabby, but I'm going to read it to see if there's anything else that you want to add. If I'm at a private practice, should I wait until they are cleared from a post op appointment from the surgeon. A lot of the reason I wait to activate is waiting on the patient to get into the surgeon for the post op appointment. So do you have any additional suggestions for Gabby? Yeah, I mean, I think it's one of those things that either if you have formal cochlear implant team meetings, like we try to do semi or bi weekly, rather, it might be a good topic to bring up as to their Rationale and their why.

Because that's how they were trained and how they've always done it. Then you can talk about how this is being done here in our practice. Some of the data that's come out again from Vanderbilt, which I'm going to talk about here in a minute, showing some of those benefits. The alternative is just to have that conversation directly. If it's something that you feel comfortable doing, just to say, maybe they do have a specific rationale, maybe it is their surgical technique or maybe their preference.

But I think, is it worth, at least worth having that conversation? Thank you.

So I was alluding to this study. This came out earlier this year, and this was a study out of Vanderbilt that looked at the potential benefits that come from early activation. They had about 600 patients in this study, and 50 of them were assigned to this early activation protocol as a part of their complete

cochlear implant care model. And interestingly, some of what they found was that patients who were activated ten days or less after following surgery had statistically significant better results in several areas as compared to those that had a standard activation time frame of three to four weeks. These benefits were greater than 2 hours more.

So not 2 hours total, but 2 hours more on average, device usage in the early activation group. So about 12 hours compared to 10 hours. And they found that CNC scores at both three months and one years were statistically greater in the early activation group. So their sort of rationale behind this at the time was that that may be related to the increased device usage. We do know that this is one of the primary factors that drives patient success afterwards is the amount of use.

And so that was kind of their theory or outcome. As to why. I think some more research needs to be done in that I have to kind of question and wonder, regardless of how soft or how soft surgical technique is done, is there some sort of downstream inflammatory process that's happening in the cochlea that can somehow be either overturned or prevented or slowed by starting that electrical stimulation process sooner rather than later?

Thank you for sharing that data. It's very interesting, and it would be fascinating if we could figure out exactly what is happening. I do want to also say that, of course, improved outcomes are the ultimate goal for all of us involved with our CI recipients. And this study and the information doctor Harris provided earlier will continue to help us all grow as an industry and provide improved outcomes for our patients. I'd like to ask you another question that came through.

Robin asked, if you are activating early, can you expand on what the audiology programming follow up is? Do they see the audiologist for activation? One month, three to six months, twelve months? What's the typical protocol? Yeah, so we've sort of took the recent MSTB three protocol in mind, and that's one of the things that has actually helped us and can kind of answer the question from before about how to

free up the audiology schedule.

But you can free up the audiology schedule by reducing the number of follow up adjustments and mapping sessions that are done. The protocol that we've implemented here is the one week activation three weeks later. So a month after surgery for a subsequent follow up visit, three months. And at that time we do objective testing, CNC and things like that. And then if patients are doing well at the three month, we actually have done away with the six month and they'll follow up at twelve.

If there's any concerns or patients maybe aren't doing as well as we would expect, or they would expect, then we have them come in at a six month visit as well. And when you were talking earlier, you were mentioning that in the state of Georgia there are nine neurotologists. So do you ever offer telehealth or virtual appointments for your patients? We do. Most of my telehealth visits actually come in our preoperative counseling.

So I work with several outside clinics where they just don't have a cochlear implant surgeon, but have audiologists who are capable of doing that. Often they will come and meet me in person. I think it's important for someone to meet their surgeon in person. But in terms of our subsequent follow up visits either to review imaging or discuss surgery more, I do offer those virtually from a programming perspective. We're in the early works of implementing remote care, remote checks and remote programming, and I'm optimistic that that will help improve our efficiency as well.

I have one more question for you. Judy says early activation sounds ideal for adults, but for children I have some concerns, especially if the family has transportation issues and doesn't follow up as intended. And there could be issues with the magnet being too strong. What experience have you had with pediatrics and what other thoughts do you have on that? Doctor Brown?

So at least in the patients that we've had to date, we've not really seen that to be a problem. I mean, we also do have some patients who do have transportation issues. And you can see that's why we do still have a range of one day to as long as 14 or 15 if it just doesn't work with patient scheduling. But I think it's just a matter of at least offering that. Regarding the magnet strength question, again, most of the time because swelling is pretty minimal.

While we may need to drop the magnet strength at the subsequent three week visit, that's not always the case either. Sometimes that's done three months or six at twelve months as that compression has occurred a little bit more. But that's also why all of my, my patients, at least all of my patients who I do surgery on have a direct means of contacting me directly via email. So if they have questions or concerns about a magnet site, they can take a picture and send that to me and I can provide that counseling immediately. Great.

Thank you. And to make sure I fully understood, you were talking about some of the different surgical techniques that you use. And it's because of those specific surgical techniques that you're not experiencing as much swelling and then these potential magnet challenges and changes over time. Yeah, I think that's the only thing I can really attribute it to. Again, when you look at that Facebook group and people posting pictures of their incisions, you still see some of the lazy ass incisions or the large c shaped incisions.

And the more you do that and fold back the actual temporalis muscle or the other soft tissue that's going to result in tissue edema and swelling by going between those suture lines and staying within that subperiosteal pocket, I think that's what's reduced our swelling and allowed us to do this effectively.

Thank you for expanding on that.

All right. Thank you, Doctor Brown. I'm going to change topics a little bit or continue the conversation is probably a better way to say that and start talking about some of the ab resources that are available for

surgery activation and beyond. Advanced Bionics has many resources to support you and your patients throughout their entire CI journey, including helping prepare patients for the initial activation appointment and providing support as patients live their lives with a cochlear implant. If you were on the session last week, I mentioned this before, but I just want to make sure to mention again that no matter where you are in the world.

AB is here to support you and your patients. As we talk through some examples during today's session, you may notice that some names of resources may be different in your region than maybe what's spoken about today. But regardless of the name of the resource, I assure you that you can count on AB's commitment to you and your recipients. I'd like to ask Doctor Brendzel a question. Doctor Brendzell, during the time between the candidacy evaluation and the activation appointment, your patients may have lots of questions and want to get a better understanding of what it's like to have a cochlear implant.

How does AB support your patients during this time? That's a great question. Lori AB staff does a great job providing support to my patients during this time. For example, in my region, the cochlear implant consumer specialist will help answer patient questions, how a cochlear implant works, what the process typically looks like, what they can expect before as well as after surgery. They'll also work with me and my patients about answering questions on the order form, such as device colors, different battery options, and accessory questions.

This time alone with the AB support helps to save me probably like ten to 15 minutes of non billable time, which is extremely helpful. Thank you for sharing those examples. And we all know that activation is a very exciting day for our cochlear implant recipients and their families. The CI activation points or appointments are very busy as well. They include programming, counseling, learning how to use the cochlear implant, and more.

So, in what ways do AB staff help prepare your recipients for activation day? Well, the AB staff will meet with our patients prior to their activation day to help them prepare for that appointment. So, for example, our consumer specialists will educate our patients on what to expect at their activation appointment as well as start reviewing what they are going to find in their cochlear implant kit. What's really great is they'll meet with our patients either by phone, in person, video conferencing, really whatever the patient prefers. We only get 1 hour for our activation appointments here.

So by having the AB support staff help prepare our patients for their activation appointment, it really helps me just to be able to focus my time on programming and other essential tasks that need to get done during that appointment. Our consumer specialists will also help my patients connect with mentors. So connecting my patients with other cochlear implant mentors helps my patients kind of prepare for that CI process, including the activation appointment. So AB mentors are typically AB cochlear implant recipients themselves or family members of ABCI users, and they help provide guidance and support along the patient's entire cochlear implant journey. Thank you for mentioning not only our AaB consumer specialists who are ab staff, but also bringing up the role of mentors.

We have mentors all over the world, and they do so many different activities. We have mentors in the UK who host social groups. They also host social media pages, and some of them even create podcasts for individuals with cochlear implants. We have mentors in Canada who host monthly virtual meetings and also attend CI support groups that are in the canadian provinces. And we have mentors in India who are caregivers who help educate schools and provide information to educational professionals about cochlear implants.

Now, even with all this information provided by you, the clinic, by the consumer specialist, by the mentors, there's a lot that goes on on the day of activation, and it can be really difficult for the CI recipients to remember everything that is shared with them on that activation day. And what ways do a

B staff support your patients after activation? Oh, that's a good question. So, in my area, a member of the AB success team will meet with our newly implanted patients, typically right after activation, to review again everything that they've received in their cochlear implant kit. They will help them with their accessories and setting them up any kind of equipment issues that they may have.

They'll help them even download the AB remote app onto their phones and discuss and show them how to use it. They'll help them troubleshoot any equipment issues they may be having, and then also just any other outstanding questions the patients may still have, they're usually able to answer. Our consumer specialist also has a kit camp once a month at our clinic, where they meet with our newly implanted patients to go over the CI kit. So that's also another option for our patients. Fantastic.

Thank you. Oral rehab is also a very important part of the cochlear implant journey, and that's whether the CI recipient is a child or an adult. So how do Ab staff in your area support your AB recipients with rehab? So they'll have. They do a lot to help with that.

So the AB success team typically will provide our patients with oral rehab exercises to help them practice and strengthen their cochlear implant speech understanding. Often they'll even help them download these programs right onto their cell phones, their tablets, their computers. I mean, AB has an online resource for oral rehab that has oral rehab tools for, like, all ages. So you have infants, children, adults. The website is hearingsuccess.com.

i have to say the best part about the connection with AB consumer support staff is they will connect to my patient right after their activation appointment, and that gives me more time to spend, like with my other patients because that's all non billable time, which is just wonderful. Lori, would you mind sharing maybe in the chat, the hearingsuccess.com link? All right, looks like Anna beat us to it, so it's there and available for everyone with all the technology that's available to ABCI recipients like Bluetooth. And Roger, how long would it take for you to teach your patients about these technologies? And what does

AB do to support you with teaching patients about all the different technology that they receive?

So I have to say it really depends on the patient and how tech savvy they are with Bluetooth apps, their cell phones, their tablets, their computers, because this can take up quite a bit of our clinic time, especially if they're new to this technology. I usually will recommend to these patients, if they're not very tech savvy, or even if they are, that the AB support page on the YouTube channel is a great resource. These videos are great for more visual learners as well as non english speaking patients because they're available in several different languages such as Spanish. I'll also reach out to the AB success team to have them help with technical or pairing issues, such as working with their cell phones again, or computers or tablets. I personally sometimes find it a little overwhelming to keep up to date on all the changes with the Androids and the iPhone.

So by being able to have my patients go directly to the AB success team, to have them work on these issues is phenomenal. The AB success team, like I said before, will also help my patients with the AB remote app or the AB remote support app. So if that patient has an upcoming remote programming appointment with me, I usually like to have them meet with the AB success team to make sure that they're ready for their appointment, that they're paired to that app, that they know what they need to do to get into the appointment. It has saved me a ton of time because I have spent pretty much the whole appointment time trying to get a patient connected to their AB remote support app in the past. All in all, I would say the AB support staff probably saves me about 30 to 45 minutes of non billable time so that I can see other patients by, you know, working with my patients in regards to these issues.

As I've conducted training events across the US, iPhone is probably the most common. And even still, with many audiologists using iPhones and many patients using iPhones, I've heard more than once. I didn't realize that being on an audiologist also meant that I needed to be able to work at the Apple genius bar. So now you don't. Please send your patients to the AB success team.

Connect your patients with us, just like Doctor Brendzel was discussing, so that you can focus on all of your audio logic skills and not be required to also potentially be able to get another job at the Apple genius bar. Very true. So, is there anything else that you'd like to share about the support aB provides you and your patients? Well, I find that the AB staff will typically go above and beyond for my patients to make sure that they're set up for success before their surgery as well as after their surgery. I've had some AB success team members actually email me suggestions after meeting with my patients about things to change, maybe in the target software.

For example, I had one patient where the AV success team member suggested changing the manual to automatic setting for the tv connector. I had another one where they suggested maybe adjusting the mic attenuation.

They'll also send. Sorry. They will also usually send me emails updating me when they meet with my patients, discussing what they talked about, what they worked on, and maybe any additional help that they still need. Which is great. So when the patient comes in, I can get right to work on what they need.

The best part though, of the A B success team is how quick they are with contacting my patients who are having issues or have questions. I would say it's typically under a day in their response time, which is a lot better than some of the other manufacturers where my patients have to wait one or two weeks just to get an appointment with them. Our consumer specialists and our AB success team really are amazing for our patients who need that extra support and the support they offer our recipients is the best out of all of the companies in my opinion. I mean, in a time when I have to be careful about spending too much time on non billable items like counseling and troubleshooting, the support and the resources that AB offers our patients is amazing. Thank you for sharing all that, and I'm glad to hear that the AB success team is able to provide so much support.

And I also appreciate that you mentioned that the team is also really good about making sure you know what's going on. At the end of the day, they're your patients. If something is going on with the patient, whether it's a success story or maybe a challenge they're facing. It's really important for you to be aware of those kinds of things. And so knowing that this team will follow up with you and keep you posted and up to date with what's going on with the patient is something that is also beneficial.

And I appreciate that you mentioned that. Now, before I ask one final question to all of our guests today, I want those of you who are on the call to think about which AB staff in your region can provide you and your patients with support after the candidacy evaluation and throughout the recipient CI journey. Now, if you're unsure of who that is, please reach out to a member of your regional team. Or if by chance you're not sure who on the regional team that should even be, you can email me and my teammates@educationandtrainingdvancedbionics.com and that was just placed in the chat and we'll happily connect you with your regional team.

So I do have one final question for all of the presenters. I'll ask you all to come back on camera and share one or two actions that CI clinics can take to be more efficient and better serve their patients. And since Doctor Harris started today's meeting, I'll ask him to answer that question first.

Sure. Thank you, Lori. Yeah, it's a good question with many potential answers, I think.

I think one action is simply having a very intentional commitment to evaluating your outcomes and recognizing where you might be able to do better and where the opportunities are. Even if you're doing an exceptional job, really, in every regard, there's always something that could be more efficient or could do better. So for us, it's looking at our hearing preservation rates and even, even being satisfied, wishing we could do even better. And so this is for us where electrocochleography comes in. But you can apply that really to, no matter where you are, where you're practicing what the nature of practice is, just a commitment to evaluating your outcomes and improving efficiencies.

Thank you, Doctor Harris. Doctor Brown, I think it's a good idea for all CI clinics or CI programs to do some sort of process mapping. And that's a pretty simple and easy way for you to look at how patients are being referred, coming into your clinic time to evaluation and sort of just graphically putting those things out and seeing where there may be either a stopgap or a holdup or a funnel, whether that be from an audiologic perspective, whether that be from a surgical time perspective. But a process map is a great way of doing that, and I would always love to put in a plug for the ICIT, the Institute of Cochlear implant training program, that does have a CI team efficiency course available annually. That's something that we did when I started the program here in 2021 and has been very, very useful for allowing us to streamline the process and grow the program quickly.

Thank you for mentioning icit, Doctor Brown. We have highlighted it on the other two webinars as well, because those presenters also mentioned how beneficial it is. And Doctor Brendzel, what would you suggest?

Well, one action that I've started to incorporate with my patients that I do on their activation day is I will have them take their cell phone out and in their contacts, I will have them put in the AB success team's phone number and email address. So that way, in the future, if they have questions or they have any kind of tech issues, they have the AB success team's information right there and they can reach out to them immediately. Great. Thank you. We are almost at the top of the hour, so I'd like to ask everyone on the call today to either use the QR code you see on the screen or the web link you see on the screen that has also been placed in the chat to answer two short questions.

This should only take about a minute of your time. We really like your feedback and are always looking for ways to improve our education opportunities here at advanced Bionics. I'm going to leave that up for just a moment while I also say to our presenters, Doctor Harris, Doctor Brown, Doctor Brendzel, thank you so much for the time that you've taken out of your schedules to be on this call and the time it took

you to prepare this information. This kind of information that you've provided is very valuable and something that people can take away and go right back to their clinics and start thinking about and reviewing some of the information that you've given to implement changes and improve their clinical efficiency. And before we sign off for today, I also want to mention that I would love for all of you on the call and some of your colleagues to join us for our next webinar.

That is next Thursday, September 26. The topic is digital solutions for personalized patient care. Our guest presenters are Jamie Jensen, Dawn Marsilia, Kerry Spangler and Dina Vasouris. We have the registration page shared in the chat that you can go to that site, register for the upcoming events, and then you can also access the events that have already occurred. I want to thank everyone for your time and attendance.

Today and give another big thank you to doctors Harris Brown and Brinzel. Thanks, everybody. We appreciate you being here.