

PODCAST TRANSCRIPT

New tools in MAESTRO 7.0: Pulse Characteristics

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In this podcast, we go into Triphasic Pulses, the new pulse characteristics that can be utilized in MAESTRO 7.0 to avoid facial nerve stimulation and other unwanted somatic effects after cochlear implantation. We talk about the discovery of this technique and how this patented technique can significantly improve quality of life for patients who experience somatic effects after implantation.

Nikhil Mathur: Hello everyone. Welcome to this MED-EL podcast in our series on the MAESTRO 7.0 fitting software. My name is Nikhil Mathur. I am Clinical Engineer in the Education & Training Department here at MED-EL Headquarters in Innsbruck. I have with me today Dr. Reinhold Schatzer. Reinhold is a Team Leader of Sound Coding here at MED-EL's Research & Development and he is one of the key individuals involved in the development of the feature we will be discussing today. Welcome Reinhold!

Reinhold Schatzer: Hi! Thank you!

Nikhil: Thank you for giving us your time today. We have heard lots about Pulse Characteristics which have been included in the MAESTRO fitting software. I understand that you and your colleagues have patented Triphasic Pulses. Can you tell me little more how it works?

Reinhold: Yes, certainly! Well, back in 2010 when Werner Sürth at the time Head of Clinical Support at MED-EL and I made an incidental discovery in a way and that was that by using Triphasic stimulation we could ameliorate facial nerve side effects in patients affected by that so it was actually a coincidence that we discovered that and

as a consequence we decided to file a patent claim seeking protection for using the method of implementing Triphasic pulses in a cochlear implant system in order to avoid generally somatic side-effects and in particular also facial nerve side-effects.

Nikhil: OK, yeah! That's very interesting! So, you mentioned a research paper before you started talking about this. Can I know some more about it?

Reinhold: Yes, certainly! Where research in Triphasic pulses already started I would say back in the early 2000 that research is documented in a couple of quarterly progress reports to NIH. At the time the group was with Eddington in Boston, doing cochlear implant research as an NIH-funded project and at the time they already looked at Triphasic pulse shapes in conjunction with different coding strategy designs and what they found was that those pulse shapes would introduce less temporal channel interaction although in terms of clinical benefit that did not really, at least not immediately, translate to a benefit in speech perception and more recently there is from 2016 a publication from a group in Frankfurt. That publication is already on our patients who have been fit chronically with Triphasic stimulation and it's a report on those patients affected by facial nerve stimulation and the benefits of using Triphasic stimulation to help those patients essentially.

Nikhil: OK, oh! That's interesting again! So, I understand that the clinician would decide to use the Triphasic pulses when there is facial nerve stimulation to the cochlear implant...

Reinhold: Yes! Yes! Correct! I would say this is certainly the indication for using Triphasic stimulation pulses. In a regular cochlear implant patient without any side effects in terms of facial nerve activation there is really no good reason to use Triphasic pulses. However, as we made that discovery back in 2012 with the first facial nerve patients, at least in 90 percent of those cases so far we could first boost the processor loudness by using Triphasic stimulation without causing any side effects and in a lot of those patients we could also introduce immediate benefits when it comes to speech perception and outcomes.

Nikhil: OK! Yeah!

Reinhold: So some of those cases, for example, have otosclerosis which is really the most or the highest risk factor for developing later on facial nerve stimulation with a

cochlear implant and the reason is that in otosclerosis you have a bony, a spongy bony structure so that current is actually leaking out of the otic capsule going into the facial nerve canal and activating the facial nerve causing the sort of muscle contractions that you would typically see in those patients

Nikhil: Yeah! Yeah! OK, hmh! There are seen advantages but with regular clinical practices it could be discovered by the clinician...

Reinhold: Yes! In a way, yes! ... and certainly again facial nerve stimulation side effects when observed with sort of standard clinical Biphasic map is, I would say, the indication for switching to Triphasic stimulation as supported now in the MAESTRO 7.0 software and trying to map those electrodes in the implant

Nikhil: Yeah! So what percentage of patients have benefitted from this feature?

Reinhold: Altogether, I think we are now at more than 100 patients worldwide who have been fit with a Triphasic map and I would say that ninety percent, approximately ninety percent of those patients achieve at least some benefit in terms of again achieving a higher processor loudness or also achieving actually better outcomes because what typically happens when you have facial nerve stimulation patients is that you cannot really raise the stimulation levels to what it should be due to MCL because you're first triggering the side effects and you sort of get facial nerve or facial muscle contractions and therefore you have to reduce the overall stimulation levels which translates to an insufficient processor loudness essentially so patients often are barely able to perceive environmental sounds or speech sounds et cetera and therefore they have poor outcomes. Now with Triphasic stimulation what we observed is that we can raise the stimulation levels significantly higher and therefore achieve better processor loudness in a way and also better outcomes in those patients without causing any side effects.

Nikhil: That's good to know! So, I think we have had a good insight about the Pulse Characteristics feature included in MAESTRO 7.0 now so thank you Reinhold for your time today!

Reinhold: Thank you very much for having me!

Nikhil: Thank you all for listening to the interview with Dr. Reinhold Schatzer. This ends our podcast on "Pulse Characteristics". I hope you all benefited from the information. We encourage you to subscribe to our podcast. Please stay tuned for the next episode. If you have any questions, feel free to write to us at e-learning@medel.com or contact your local MED-EL representative. We look forward to receiving your feedback! For more information visit www.medel.com .