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## Objective Assessment of Hearing: Interview with James W. Hall III, PhD

Douglas L. Beck, AuD, speaks with James W. Hall III, PhD, about his new book, *Objective Assessment of Hearing* (co-authored by De Wet Swanepoel).

**Academy:** Hi, Jay. Thanks for your time today. I think all of our readers know who you are, but let me just provide a brief intro for you and your book's co-author, De Wet Swanepoel. And, I promise it'll be brief. You're at the University of Florida in Gainesville where you serve as clinical professor of audiology. De Wet is an associate professor in the department of Communication Pathology, University of Pretoria in South Africa.

**Hall:** Exactly right.

**Academy:** Okay, so we're off to a good start! I recently read your and De Wet's new 2010 book *Objective Assessment of Hearing* and I really enjoyed it's straightforward and "greatest hits" approach to the topics covered.

**Hall:** Thanks, Doug. The mission of this book is a bit different from my usual in-depth look at topics and clinical concepts. In fact, as you know, Doug, this book is part of the new Plural series titled "Core Clinical Concepts in Audiology," which is a new series of books written for students and busy audiologists, and as you noted, it's sort of the "greatest hits" version.

**Academy:** So in other words, these are your and De Wet's thoughts and ideas encapsulated into less than 200 pages, which includes eight chapters on current areas of interest such as immittance measures, OAEs, ECOG, ABR, ASSR, and recommendations for screening protocols? And, I presume these chapters were written for folks who may find more than a 1,000 pages on OAEs, and perhaps more than a 1,000 pages on ABR to be a bit of overkill?

**Hall:** Yes, that's one way to look at it!

**Academy:** But seriously, these chapters are very informative. In fact, this book reminds me of Frank Musiek's book from 20 years ago (or so) on various topics in neuroaudiology...very well written overviews and very brief summaries of what's new and what's what.

**Hall:** Thanks, Doug. I'll take that as a compliment! In fact, when you and I were students, there were those little green books on multiple topics such as bone-conduction, masking, tympanometry, etc., and it was so useful to have current and concise versions of that material. I think there's still a need for these sorts of publications for busy audiologists and students.

**Academy:** Indeed. I recall the Zenetron monograph on hearing aids from some 25 or 30 years ago. I'll bet I used that monograph for a decade or more. ASHA had an excellent overview pamphlet on ABR and short latency-evoked potentials, too, and those are really handy, and quick-reads and they make it simple and they make a lot of sense.

**Hall:** Right, and that's the idea behind the new Core Clinical Concepts series.

**Academy:** Okay, so let's get into some of the topics, based on my notes while I was reading through the text. One thing that caught my eye early on was your clear and concise statement that significant hearing loss, that is hearing loss which may certainly cause educational, social and academic problems starts at 15 dB HL in children, and arguably 25 dB HL in adults. But the point is that children with 15 dB of hearing loss are at least two or three standard deviations away from "normal hearing" for a child and depending on how that child is doing, amplification via hearing aids, FM or whatever technology is appropriate is always worthy of consideration.

**Hall:** Yes, exactly. Let me go back to one of the many points you just made. Indeed, 5 dB is the standard deviation for hearing loss in children and so a 20 dB hearing loss can represent a very significant hearing deficit. I know we've each used this example before, but for moms and dads and pediatricians who haven't heard it previously, and who may think a 15 or 20 dB hearing loss doesn't require treatment, just place a set of E-A-R plugs (from any pharmacy) in your ears and try to get through your day! That's a good approximation of the same hearing loss, and for a child trying to learn and acquire speech and language—that's a very significant and devastating problem.

So to be very clear, a child with a 15 or 20 dB hearing loss needs amplification tools to maximally perceive even the quietest speech sounds. Of course, not each child is the same, and of course, the treatment options need to fit the needs of the specific child. However, as you said, FM, hearing aids, even assistive listening devices are certainly worthy of consideration and I would say as a rule of thumb; 15 dB of hearing loss in a child needs to be treated unless proven otherwise for a given child.

**Academy:** Yes, I totally agree. In fact, Northern and Downs said exactly the same thing in their *Hearing in Children* text from almost some 40 years ago! Okay then, moving on, I liked the quick notes on single versus multi-frequency tympanometry on page 17 and I liked the endorsement of the 1000 Hz probe tone for children less than 4 to 6 months of age. But, I must admit, I'm still trying to grasp wideband reflectance, also on page 18. Pat Feeney and colleagues did a nice job with that at the recent Texas Academy of Audiology meeting, but I'm still a bit fuzzy on the gestalt. Can you give me the greatest hits version of wideband reflectance?

**Hall:** Sure. Well the first thing to know is wideband reflectance and wideband middle ear impedance (WMEP) refer to the same thing, and these techniques are excellent for detection of middle-ear pathology in infants and children.

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In brief, wideband reflectance is similar to immittance, but it's more sophisticated. So you can think of it as a complex analysis of the energy accepted and reflected by the middle-ear system. The big advantage over immittance measurement is that reflectance is done at atmospheric pressure, so you don't need to "seal" the probe in the ear canal as you sample energy across a wide range of hundreds of frequencies from about 250 to 6000 Hz or higher, very quickly, and may indeed provide an alternative to tympanometry.

**Academy:** Okay, very interesting. And so, if you combine reflectance and OAEs, you might get the best of all worlds with regard to pass/fail screenings for middle ear disorders?

**Hall:** Well, it's too early to say with certainty, but, yes, it might take us there one day.

**Academy:** Jay, on page 37, you state emphatically that OAEs have "essentially no value in defining the degree of hearing loss." And I think for many clinicians who have not kept up with your books and the current state of the art, they may find that to be very surprising.

**Hall:** Sure. Well for so many years, people were trying to show that OAEs could be used to estimate hearing loss, but that's just not the best tool for the job and the correlation between hearing thresholds and OAE results is not at all a one-to-one relationship. So, the bottom line is that OAEs are not a test of hearing, and they cannot be used to accurately predict hearing thresholds.

**Academy:** Okay, very good...and skipping ahead to the chapter on electrocochleography (ECOG). Frankly, I used to think of ECOG in terms of AP and SP ratios and trying to use those metrics to help diagnose Meniere's or endolymphatic hydrops—none of which proved to be particularly accurate in my mind. Nonetheless, it was refreshing to read the chapter on ECOG and to realize you wrote about it only with regard to determining auditory thresholds—for which ECOG is very well suited.

**Hall:** Right. ECOG is one of those tests that adds to the test battery, but actually cannot be used to replace ABR. In fact, a lot of audiologists gave up on ECOG when ABR came along, but the Europeans stuck with it. Some European audiologists use ECOG to define auditory thresholds, and it works very well when used for that purpose, and it adds to the AN/AD battery as well.

**Academy:** Okay, well we won't go into that here, but, yes, the chapter is very illuminating. And, what can you tell me about ASSR? Is it ready for prime time?

**Hall:** Absolutely. ASSR is a topic De Wet really dives into in the new book and I want to be sure to recognize his important work here. But, to me, we have barely started to exploit the benefits of ASSR clinically. Very simply—I use it every week, such as when I run into a patient who has severe to profound thresholds on ABR.

**Academy:** Right—and that's one of the many benefits of ASSR, such as defining thresholds on a newborn between 70 and perhaps 95 dB HL via neurophysiology. This is so important because as an audiologist, if I see a child with 70 or 75 dB thresholds at birth, I would be very tempted to go with power hearing aids, fine. But if I know that child has a hearing loss with 90 or 95 dB thresholds, or greater,, my personal decision would likely be to go straight for a cochlear implant.

**Hall:** Yes, that's right. It's very reassuring for the infant's parents and to know at the outset that a cochlear implant should be considered as one of the management options

**Academy:** Right, and of course that is very important with newborns and children.

Okay, Jay—I guess we could spend the better part of the day talking about the book, the findings, and the implications, but we just don't have that sort of time. So, I hope the readers will get the idea that this is a valuable and quick read, and it will get them up-to-speed on many advanced topics impacting audiology in 2010.

**Hall:** Thanks, Doug. I appreciate your interest in our work.

*James W. Hall III, PhD, is a clinical professor of audiology at the University of Florida in Gainesville, FL. Objective Assessment of Hearing co-authored by De Wet Swanepoel and is published by Plural Publishing (ISBN 9781-59756-353-6).*

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