

# The Oticon Fitting Approach

## INTRODUCTION

2020 marks the year where we elevate our well-known BrainHearing™ concept to reflect much new knowledge and research within hearing science and brain functions related to and affected by hearing loss.

An obvious question is, how do we relate our new-found knowledge on brain and hearing processes to the optimal fitting of hearing aids? The aim of this short paper is to give the hearing care professional the Oticon direction on what an optimal fitting of our own products may include and the steps we continuously take to heighten to quality of fittings. Our most important goal here is to support the brain processes in the best possible way to get the most benefit out of wearing a modern hearing aid.

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## The times we live in

As a hearing care professional, you pride yourself in fitting hearing aids that make your clients happy, improve their quality of life, and make a difference for their health and well-being. This is what gives most professionals work satisfaction and it is the reason we go to work every day to do what we do best. However, fitting a hearing aid in and of itself is not enough. It requires high quality counselling and a customized and person-centred approach to rehabilitation. This is what provides the best clinical outcomes, the highest satisfaction (McMillan et al, 2013, Olsson et al, 2013), and it is what sets us apart from hearing products purchased over-the-counter, hearables, and personal sound amplifiers (PSAPs). Across the globe, the training and education needed to practice audiology varies greatly, but common to all is the use of hearing aids in rehabilitation of hearing loss. So what can Oticon do to fulfill our part as a hearing aid manufacturer?

On February 5, 2020, our message of People First was expanded to Life-changing Technology. This change was crucial in order to better communicate to the world that we put people with hearing loss at the center by providing them with cutting-edge technology that is truly life-changing for millions of people. We also put forth five characteristics that help define for others who we are as a company and how we work (Figure 1). When introducing a fitting approach in light of these five elements, the following is true:

We must remain open and curious to explore new technology directions and embrace the directions the evidence tells us to go. When we gain new insights into

brain-related benefits, these must be reflected in the way we develop hearing aids and how we optimally fit them to obtain these benefits. The technology we develop must be capable of delivering brain-related benefits. We must be committed to hearing care professionals and the multitude of ways in which they work and treat hearing loss - we must support them by making fitting solutions that are intuitive, allow for wide flexibility, and serve as a professional tool to fit hearing aids optimally. Finally, Oticon hearing aids must be tailored to user needs and their daily lives, and we must always remember that improved quality of life for millions of people with hearing aids is our ultimate goal.

## BrainHearing benefits

Increasingly, evidence points towards the importance of well-fitted hearing aids if we want to ensure benefits to brain function and brain health. At the University of Colorado, Anu Sharma and her team have done extensive work to show that untreated hearing loss leads to cortical re-organization (Glick & Sharma, 2017). Additionally, Glick & Sharma (2020) have started fascinating work on cross-modal brain reorganization when a person has mild-to-moderate hearing loss. Their latest research shows that treatment of hearing difficulties with well-fitted hearing aids in accordance with best practice guidelines, counselling, verification, validation, and adequate use time (+ 5-6 hours per day minimum) showed a reversal in cross-modal reorganization, coinciding with improvements in speech perception and cognitive performance benefits.



## The five characteristics

- 1 Open and curious
- 2 BrainHearing™
- 3 Technology pioneer
- 4 Devoted to users
- 5 Committed to professionals

Figure 1. The five defining characteristics of Oticon.

### How much sound is at the eardrum?

It may seem obvious, but audibility continues to be key. We have to be able to show that when the hearing aids are fitted, the user can hear the sounds they were missing to the greatest degree possible. The best way to ensure that the user has access to the sounds we want to provide is by measuring the sound level at the eardrum for each individual ear - the so-called real-ear measurement (REM). Besides the proximity of the hearing aid output to generic or proprietary rationale targets, we can gain valuable information about how much speech energy is available and audible for the hearing aid user, using the Speech Intelligibility Index (SII). This is a single number between 0 and 100 (%) and it is therefore very simple to use as a counselling tool and as a gauge for how much speech the user is gaining from wearing hearing aids. We can also use the root mean square error (RMSE) score at a single frequency or over a range of frequencies to easily see how close (or far) we are from reaching target gain. A simple rule in accordance with Best Practices guidelines (British Society of Audiology, 2018) is that targets should be within +/- 5 dB of the target between 250 Hz and 6000 Hz.

### Oticon study: importance of dynamic audibility

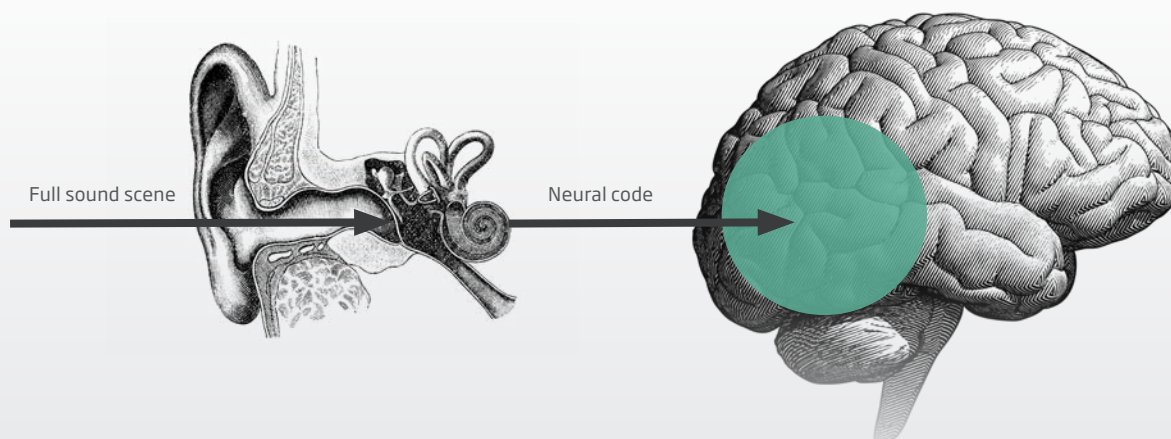
In 2019, a study was done at Oticon to show the Brainhearing benefits of the feedback prevention feature, OpenSound Optimizer, in the Oticon Opn S hearing aid. A comparison was made between target-matched optimal gain and being 6 dB underfitted due to gain limitations brought on by use of the traditional gain reduction feedback management strategy. These gain reductions happen throughout the day when the hearing aid is in feedback risk prone situations and are invisible to the hearing care professional but may be quite apparent to the hearing aid user who experiences the sound as too soft and maybe varying audibly in intensity.

We observed that optimal audibility not only needs to be measurable in the quiet clinic environment but that preserving audibility throughout the day leads to a 15% improvement in speech intelligibility scores and additional 10% improvement in memory recall, a true brain benefit (Juul Jensen, 2019).

### Changing the users' perceived quality of life

In the MarkeTrak 8 large-scale survey (Kochkin, 2011), a link was found between perceived quality of life and hearing handicap. 9 out of 10 hearing aid users perceived a significant quality of life improvement if they perceived a hearing handicap improvement of at least 70% while using hearing aids in a wide variety of listening situations. As it turns out, in order to achieve a 70% hearing handicap improvement with hearing aids, a 70-80% compliance with Best Practices Audiology guidelines was necessary. Certain Best Practices had greater impact in the rehabilitation experience than others. As an example, of the hearing care professionals who were 90% or more compliant with Best Practices guidelines, 82% of them performed REM verification on their clients, whereas for the same group, only 7% of them encouraged their clients to use a self-help video, even though this might be a good option for some.

If we want to see a true quality of life change for people with hearing loss, we must encourage and support the tasks that are a key part of the practices of hearing care professionals with the highest compliance to Best Practices principles. This includes spending 15-20 minutes more on counselling and including REM verification, objective speech-in-noise testing, loudness discomfort level measures and a self-help measure, such as take-home reading material. Much work has been done from the hearing aid and diagnostic equipment manufacturers to ease clinical tasks and develop quick and reliable solutions. As an example, REM verification



is integrated into the fitting software and a speech-in-noise test such as QuickSIN can be done in 5 minutes with headphones or inserts through some audiometers.

So what does the client and the hearing care professional gain from essentially adding more tasks to the fitting visit and follow-up visits?

The hearing care professional sets him/herself apart from competition by showing concrete before and after results of a hearing aid fitting and, more importantly, can directly quantify the benefit towards their client. Kochkin (2011) shows that, on average, a hearing care professional can save 1-2 follow-up visits with their client by performing these measures up front and investing a bit more time at the start of their client's hearing journey.

The client will gain trust in their hearing care professional who diligently performs objective and subjective measures to create the best possible hearing experience. This trust potentially leads to more referrals and does lead to fewer returns (Kochkin, 2010). Due to the high quality fitting with good audibility, the client will also experience better sound quality and more sound in their life, which is the main reason they came to our doorstep in the first place.

### Core brain friendly hearing aid features

We have established that a hearing aid fitting with verified audibility and adherence to some key Best Practices

guidelines simply gives better access to brain benefits, in addition to the irrefutable hearing benefits. But what are the key Oticon hearing aid technologies that add quantifiable brain and hearing benefits? To answer this question, we must look at the available evidence related to the specific hearing aid technologies. Figure 2 shows an overview of the key BrainHearing features available from Oticon as of August, 2020 from essential to premium hearing aids. Oticon has a long history of detailed knowledge sharing with our hearing care professionals and this is a source of pride and satisfaction with the products we develop. White papers provide information on key evidence in the areas of speech understanding and audibility in listening conditions of varying difficulty, as well as evidence on the benefits related to mental load, such as listening effort and long and short-term memory recall. For an extensive list of Oticon white papers that document hearing and brain benefits, visit [www.oticon.global/professionals/audiology-and-technology/technologies/research](http://www.oticon.global/professionals/audiology-and-technology/technologies/research).

With the evidence-based feature set shown in Figure 2, we can provide relief from the cognitive load that hearing loss leads to, especially in difficult listening situations. OpenSound Navigator can be customized to the user's needs and capabilities by assessing with either subjective personalization questions in the Genie fitting software or even using an objective speech-in-noise measure. This allows us to provide more help to those who need it the most. SpeechGuard also plays a key role. While preserving audibility is key, it must not come at the expense of compressed sound or distortion

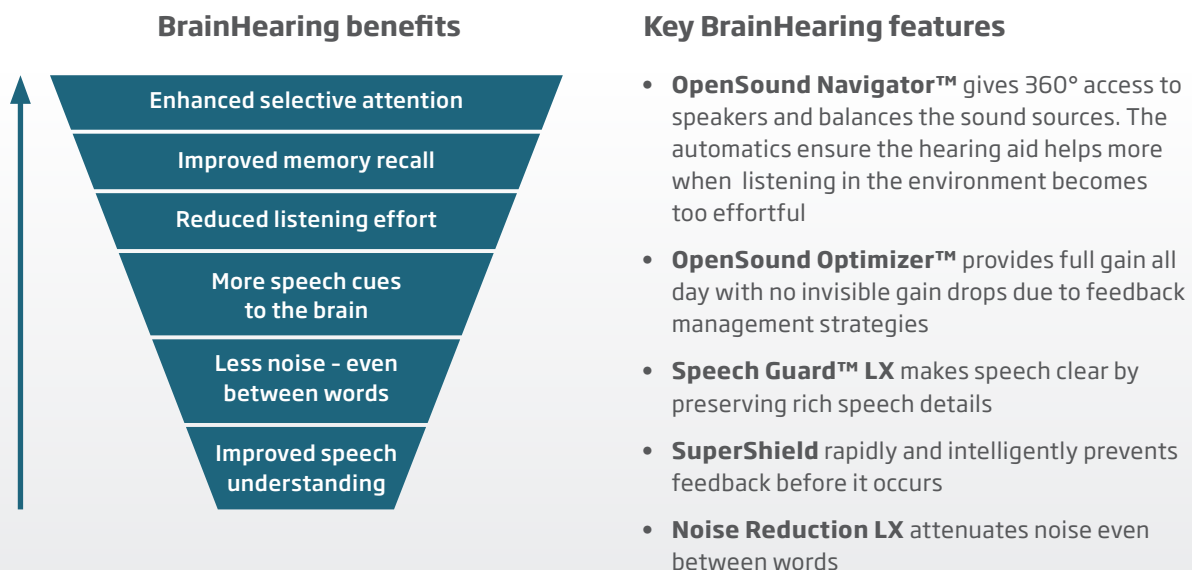


Figure 2. BrainHearing benefits and the five key brain-friendly Oticon hearing aid technologies

and artefacts. Together with OpenSound Navigator and OpenSound Optimizer, SpeechGuard contributes strongly to the provision of a high quality, clean and clear sound picture which helps the brain make sense of sound.

### **What else is Oticon doing to support optimal fitting of hearing aids?**

In the real world, many hearing care professionals have time constraints, financial constraints or other constraints that prevent them from verifying gain targets for either some or all of their clients in their daily practice. Mueller et al. (2010) reported that the overall usage of probe-mic measurements was 39% in 1995, 42% in 1999 and 37% in 2003. These numbers vary slightly and REM use is higher in paediatric fittings, but overall, numbers remain fairly low. There are several areas where we as a hearing aid company can support our hearing care professionals and Best Practices guidelines to improve the quality of fittings with the hearing aids we develop.

#### **Expanding REM AutoFit**

One way is to continue to implement better, faster, and easier methods to perform verification as part of the fitting flow and this work is ongoing at Oticon. With the HIMSA communication protocol, Inter Module Communication 2, Oticon's REM AutoFit feature can communicate easily with an extensive list of REM systems on the market today: Interacoustics, Audioscan, MedRx, Auditdata, Otometrics, and Siemens (Rumley & Crowe, 2019). This means REM measurements are performed in the Genie 2 software and targets are automatically adjusted to be within the desired and recommended margins for Best Practices, saving valuable time. The design of REM AutoFit has considered implementing as many "short cuts" for the hearing care professional as possible to save time and ease use. Besides adjusting gain automatically to match targets, the hearing care professional does not have to open multiple software applications, REM data is viewable directly from Noah Fast Data View, and targets for Oticon's proprietary rationales, VAC+ and DSE, can be verified as well. These implementations save valuable clinic time and improve fitting accuracy (Rumley & Crowe, 2019). It also helps hearing care professionals feel confident that they are ensuring access to adequate gain for their clients.

### **Providing tools for successful remote fitting of hearing aids**

With an increasing focus and need for good and reliable remote fitting options, Oticon has developed a quick guide, First fit with Oticon RemoteCare (2020), that supports an optimal fitting of the client, acknowledging the needs of the world we live in today where face-to-face rehabilitation sessions are not a possibility for a multitude of reasons. The guide specifically addresses first fittings that have not previously been part of the recommendation and scope of using RemoteCare. Getting an accurate and up-to-date audiogram is one of the major challenges associated with new clients and first fittings, but by using the Grason-Stadler AMTAS Flex standalone test with a tablet and calibrated headphones (Grason-Stadler website, 2020), it is possible to get an accurate screening of hearing thresholds either curbside or post/courier, until the client can revisit the clinic for a comprehensive audiogram and verification. Our work and life circumstances sometimes force us to rethink how we get crucial audiology work done, but advancements such as AMTAS Flex allow us to take the first steps into fitting optimally, also in a remote fitting situation.

### **Summary**

Oticon is committed to providing high quality products that have been developed based on solid evidence and a commitment to helping people with hearing loss. The evidence is twofold, showing benefits to both the hearing deficiency itself, as well as the resulting mental challenges, such as listening effort and remembering conversation. In order to obtain the greatest benefits possible, we support fittings with optimal audibility of the full sound scene and general adherence to Best Practices audiology guidelines to the greatest extent possible. We strive to continuously improve our own solutions to enable a faster and more efficient work flow that supports integrating Best Practices audiological procedures into everyday practice.

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