Phonak Insight

Everything you need for a truly child-friendly fitting

Junior Mode in Phonak Target™

Latest pediatric developments: Junior Mode in Phonak Target™

Introduction

Launched in 2006 within the Phonak iPFG fitting software, the Junior Mode is evidence-based, customizable pediatric fitting software which aims to make pediatric fittings more accurate and efficient. Drawing on new research and new feedback from the market, the iPFG Junior Mode features have been updated and transferred to the latest generation of Phonak fitting software, Phonak Target™. The purpose of this Phonak Insight is to recap on the rationale behind developing the Junior Mode and to then examine in more detail the newest Junior Mode features in Phonak Target™. These include improvements in Junior defaults for teens, the Junior Quick Overview which enables a glance at the key aspects of the child's fitting at the touch of a button, the possibility to view the audiogram as an SPLogram for counseling purposes, a reminder to switch to the age appropriate Junior Mode as the child grows older and easy access to the Junior Reports.

Why do we need special fitting software for children?

Children's needs are very different from adults. Among other things, children are exposed to diverse, often noisier, listening environments. Young children are also unable to give feedback to their audiologist about their hearing instruments, yet they often rely on them significantly to develop speech and language. Additionally, there is evidence to suggest that children process sounds differently compared to adults. Children with normal hearing perform more poorly than normally hearing adults on many auditory tasks and are at a disadvantage in many listening environments. For example, children need higher signal-to-noise-ratios (Hall, Grose, Buss and Dev, 2002), lower reverberation times (Neuman and Hochberg, 1983) and are less able to make use of context (Nittrouer and Boothroyd, 1990). Hearing impaired children have a "double disadvantage" and therefore need a well designed and highly accurate hearing instrument fitting and regular follow up in order to be given the best chances in life.

Pediatric fittings require a holistic, multi-disciplinary approach. With the introduction of newborn hearing screening and rapid advances in technology, the opportunity for improved long term outcomes for hearing impaired children has increased dramatically. Several studies have indicated that early diagnosis and intervention provides more positive outcomes for hearing impaired children and their families (e.g. Robinshaw, 1995; Apuzzo and Yoshinaga-Itano, 1995; Yoshinaga-Itano, Sedey, Coulter and Mehl, 1998). These positive outcomes can only be achieved through early intervention, which ideally includes the use of high quality hearing systems fit with pediatric-friendly software.

The needs of children also vary widely depending on their age. For example the requirements of a 6 month old infant will differ from those of a school aged child, and contrast even more to a teenager. For this reason, in iPFG and now in Phonak Target™, Phonak has developed three Junior Modes: 0-4 years, 5-8 years and 9-18 years. As well as meeting prescription targets, there are many other questions hearing care professionals often need to consider when fitting a child. For example:

- Which features should be activated and which should be disabled?
- How many programs should the child have?
- When should directional microphones be introduced?
- How does programming change as the child grows?
- What printed information is useful for the child, parents/caregivers and teachers?

These questions can be challenging for both new and experienced pediatric hearing care professionals. The hearing instrument technology, including features, programs and manual controls, must be matched to the needs of the child and their family. The Junior Mode was developed in order to help answer these questions and to provide efficient, accurate and tailored pediatric fittings, taking into account the latest research and developments.

PHONAK life is on

History of the Junior Mode

The Junior Mode was first launched in iPFG in 2006, with input from the Phonak Pediatric Advisory Board, pediatric experts in the field and available research findings, where possible peer-reviewed. The Junior Mode is a one click pediatric configuration based on the date of birth of the child and aims to enable more accurate, efficient pediatric fittings for both experienced and inexperienced fitters.

The Junior Mode provides:

- Evidence-based, customizable, pediatric defaults tailored for infants and toddlers (age 0-4 years), school children (age 5-8 years) and teens (age 9-18 years)
- Printable, tailored Junior Reports for parents, care-givers, teachers and children. The purpose of the Junior Reports is to empower families and children by providing individualized information about the child's hearing loss, hearing system settings as well as in depth information on a wide range of relevant topics.
- A holistic approach, taking into account the changing needs of children as they grow.

Annual Phonak Pediatric Advisory Board Meeting, Como, Italy, June 2010: Marlene Bagatto, Andrea Bohnert, Janet DesGeorges, Melody Harrison, Dawna Lewis, Kevin Munro, Patricia Roush, Susan Scollie, Richard Seewald, Anne Marie Tharpe, Jace Wolfe

Why provide an evidence base?

The need for evidence-based practice has grown over the past decade (McCreery, 2008). However, McCreery states that sometimes there is limited availability of research evidence due to the heterogeneity of hearing impaired children who use hearing instruments, and the fast pace of technological development. Dollaghan (2007) points out that evidence based practice should encompass not only external resources, such as peer-reviewed research published in respected journals, but should also be based on the clinician's experience and expertise and the preferences of an informed parent or family member.

The importance of customizable Junior defaults

To help chose features, program options and prescription formulae for children it is important to have an evidence base. However, as there is no one "right" way of fitting a child, all of the Junior Mode defaults are customizable so that defaults can easily be changed to match the needs of both the fitter and the child.

There are several pediatric fitting issues which are controversial with differing expert opinion. One example of this is when to use directional microphones with children and indeed which type of directional mode to use (fixed directional versus adaptive). In the development of the Junior Mode, several of these issues were reviewed and discussed with experts to provide the evidence based Junior defaults. However, as pediatric hearing care professionals have their own areas of expertise, the defaults can easily be changed. Please see the Phonak Focus 39 for an in-depth discussion of the evidence base, as well as case studies highlighting the differences in the Junior Mode defaults depending on age.

Junior Mode in Phonak Target™

Due to the success of the iPFG Junior Mode in the market, the full functionality of this mode has been carried over to Phonak Target™, with additional exciting new pediatric friendly features. The latest research evidence and feedback from focus groups and pediatric audiologists from around the world have been taken on board. The new features are discussed below:

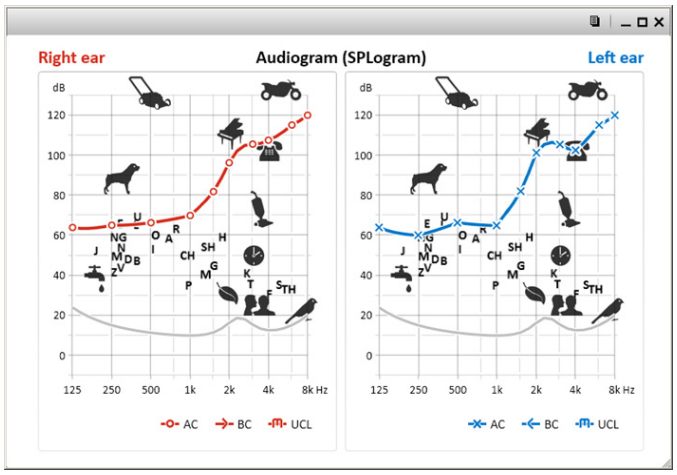
Junior Quick Overview

This new, easy to access, printable screen gives a quick overview of the individual child's fitting information, such as hearing instruments/FM/Accessories, RECDs, number/name of programs, start-up program, manual controls and directionality. The Junior Quick Overview enables a snapshot of the child's fitting at a glance.

Junior Mode Quick overview screen

Audiogram available to view as an SPLogram

Highly useful for counseling purposes, particularly for those clinicians who use the DSL prescription formula, the audiogram is now available to view as an SPLogram. When an insert earmold/insert earphone is chosen as the audiogram transducer, the age appropriate average RECD will also be included in the hearing threshold data. The phonemes from the speech spectrum and sound examples can also be viewed.



Junior Mode SPLogram screen

Reminder to switch modes

As the child enters a new Junior Mode age range, Phonak Target™ automatically asks the hearing care professional if they wish to switch between modes. There is now also the option to keep the fine tuning from a previous mode, so that time spent by clinicians matching prescription targets is carried through to the next mode. If this option is chosen, additional programs and defaults will be added to match the new Junior Mode while the fine tuning remains the same.

User-friendly access to the Junior Reports

The Junior reports are available at any point during the child's fitting. The child's name, date of birth, hearing instruments and serial numbers are visible on each report.

Improvements for teens

As children get older, they often find themselves in noisier, more complex listening environments where directional microphones can be an advantage. The Junior microphone default in the Speech in Noise program of SoundFlow has changed from fixed directional in iPFG to a multi-channel adaptive directional microphone in Phonak Target™, as some recent studies with adults and school aged children have shown an improvement in speech recognition for adaptive directionality over fixed directional/omnidirectional responses (Ricketts, Hornsby, Johnson, 2005; Auriemmo, Kuk, Lau, 2009). The microphone default for Junior Mode 0-4 and 5-8 remains omnidirectional and fixed directional respectively, based on research and input from the Phonak Pediatric Advisory Board. For a more in-depth discussion of the use of directional microphones with children, please see the Focus 39. As with all the Junior defaults, the new directional microphone default in Phonak Target™ can easily be changed to fixed directional to suit the child and the fitter. Please see the Junior Mode desktop fitting guide for a step by step guide.

In Junior 9-18, a manual telephone program (Acoustic Telephone) has also been added by default so that older children and teens can have easy access to the telephone.

Start up program: Junior FM+Mic

The start-up program within the Junior Mode is Junior FM+Mic by default, previously called FM+M in iPFG, as long as the hearing instrument supports FM. This allows easy access to FM solutions as the child's instruments are always "FM Ready". Due to feedback from clinicians and families, the name has been changed from FM+M to Junior FM+Mic as the former name was found by some to be confusing. However, the Junior FM+Mic program in Phonak Target™ is the same as the FM+M program in iPFG. Additionally, the microphone settings of Calm Situations and Junior FM+Mic continue to be identical. This means that optimized performance to prescription targets can be maintained regardless of which of these programs is used.

FM systems are not only useful at school but also in other situations such as at day care, at home and during outdoor activities (Gabbard, 2005). For older children and teens, FM systems provide access to the teacher's voice in the less than optimal school listening environment, as well as allowing access to a broad range of important social activities such as family gatherings, going to the shopping mall or having lunch with friends.

DSL v5 implementation in Phonak Target™

The default fitting formula for the Junior Mode is DSL v5 Pediatric, which is the most recent version released in 2006. The DSL prescription formula was originally validated to ensure that children, even those too young to respond to test signals, are given appropriate amplification. However, NAL-NL1, NAL-NL2 or the Phonak Adaptive Digital proprietary formula can also be easily chosen as a default.

In Phonak Target 1.2, a comprehensive and updated implementation of DSL v5 includes the following improvements:

- Foam ear tip RECDs
- MPO based on REAR90
- Verification tool

Phonak Target 1.2 incorporates an optimized verification tool which prepares the hearing instrument for test box or real ear verification, by turning off all adaptive features and SoundRecover, with one click. In line with how hearing aids are verified today, the new verification curves shown are based on modulated speech signals such as those used in the Verifit system. Three display options are available: 2cc, Real Ear SPL and Ear Simulator. These curves aim to make verification easier as they include the hearing thresholds, the prescription targets and the hearing instrument response.

Direct Sound Compensation

Direct Sound Compensation (DSC) ensures that amplification is not applied for naturally audible sounds, such as those sounds that directly enter the ear canal through a vent for non-occluded fittings. This is useful for children with milder hearing losses or those who require vents to help with frequent ear infections. DSC ensures that both direct and amplified sounds combine for the best possible sound quality. We understand that it is still important to be able to match prescription targets in a verification test box. However, with DSC, pediatric hearing care professionals may see a deviation from prescription targets in the lower frequencies, to account for natural sound entering the ear in more open pediatric fittings.

Direct Sound Compensation:

- has a greater effect as the vent size increases (usually for milder high frequency hearing losses)
- affects frequencies typically below 1 kHz, by up to a maximum of 20 dB
- affects fittings in the region where the insertion gain is less than 6 dB
- has a slight effect on fittings with insertion gains of 6-10 dB
- has no effect on fittings with insertion gains of more than 10 dB
- affects Calm Situations and the microphone component of the Junior FM program in exactly the same way, ensuring that the microphone settings are still identical

DSC aims to allow a more natural sound quality for both adults and children.

Conclusions

Launched in 2006, the Junior Mode is evidence-based, customizable and aims to make pediatric fittings more accurate and efficient. The Junior Mode in Phonak Target™ takes all the features of iPFG and has improved them further by drawing on new research, and new feedback from clinicians and families. We are already working on future developments to make the software even more user-friendly and valuable to further maximise the outcomes for hearing impaired children. Clinicians can also contact us with comments, suggestions or questions.

Further Information

Junior desktop fitting guide: available in Phonak Target™ by clicking on **[Help]>[Desk top fitting guides]>[Junior Mode]**

Phonak Focus 39: Latest developments in fitting software for children
www.phonakpro.com/pediatric_fitting
www.phonak.com/soundrecover
www.FMeLibrary.com

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