Learning Objectives

• The participants will be able to identify the newest features in the ReSound LiNX 3D family.
• The participants will be able to explain how the modern design of the ReSound Smart Fit fitting software and the ReSound 3D app can improve patients' experiences.
• The participants will be able to explain how to determine the appropriate candidacy for using ReSound Assist.
The Hearing Ecosystem

The Hearing Aid
- Sound Quality
- Noise Tracker II
- Binaural Directionality II

Personalization
- APPS

Made for iPhone®

Sound Connectivity
- WIRELESS

ReSound LiNX 3D Complete Solution

GN Online Services

Client

Hearing care professional

GN Making Life Sound Better
Hear More Than You Ever Thought Possible

Our commitment since 2009, Surround Sound by Resound harnesses advanced technologies to emulate the human ear, taking advantage of the brain’s natural ability to recognize and localize sounds while maintaining an open sound picture.

Surround Sound by ReSound delivers:
• Clear, rich, vibrant sound
• Exceptional speech understanding
• Best sense of where sounds are coming from

Further Enhanced Sound Quality and Hearing in Noise with Binaural Directionality III
ReSound LiNX 3D: Binaural Directionality III

ReSound Binaural Directionality III – a binaural listening strategy using 2.4GHz device-to-device signal processing

The third generation provides:
1. 360-degree audibility and awareness in quiet and speech-only situations
2. Improved hearing in noise when speech is in the front.
3. Optimized audibility of surrounding sounds
But, people look at who they want to listen to, right?…

- Significant portion of active listening is not from in front
- Hearing aid signal processing cannot predict the signal the listener desires to hear

Distribution of the Hearing Aid Use Log data by signal location. Multi indicates that the location of the sound source was not fixed (e.g., participant’s spouse was moving around the kitchen while talking to him).

Cord et al 2011

Traditional Directionality – Tunnel Hearing
Binaural Directionality

ReSound Binaural Directionality
Binaural Auditory System: Awareness Strategy

Binaural auditory system: Better ear strategy
Binaural Directionality III: Optimizing surround audibility

A whole new directional system
Because ReSound LiNX 3D is up to 50% better at identifying speech in various environments, users can:

- Understand 40% more speech in noise**
- Hear up to 80% more of the sounds around them**

ReSound LiNX 3D is up to 50% better at identifying speech in various environments

- ReSound LiNX 3D and premium hearing aids from 5 other manufacturers were exposed to a conversation between a male and a female speaker in different kinds of noisy environments (party, train station, grocery store, hand mixer etc.)
- The hearing aids were connected to their respective fitting software and the data logging was read from the hearing aids
- All manufacturers have classification environments that include speech-in-noise
- ReSound LiNX 3D showed the greatest accuracy at 98%. The least accurate hearing aid classified only 42% of hours as speech-in-noise.

Source: Groth (2015)
Effect of Binaural Directionality III: Clinical research

Three listening situations were evaluated with noise, multiple location speech maskers and a speech stimuli target

Devices evaluated
• ReSound LiNX 3D with Binaural Directionality III
• Two premium hearing aids with binaural beamforming directional processing

Test condition: Talker front

Speech Reception Threshold (SRT) in dB SNR (lower values are better)

* Lower values are best
Test condition: Talker left

Speech Reception Threshold (dB SNR)

<table>
<thead>
<tr>
<th></th>
<th>ReSound hearing aid</th>
<th>Hearing aid A</th>
<th>Hearing aid B</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>7.6</em></td>
<td>22.5</td>
<td>26.2</td>
<td></td>
</tr>
</tbody>
</table>

* Lower values are best

Test condition: Talker behind

Speech Reception Threshold (dB SNR)

<table>
<thead>
<tr>
<th></th>
<th>ReSound hearing aid</th>
<th>Hearing aid A</th>
<th>Hearing aid B</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.3</td>
<td>26.4</td>
<td>29.9</td>
<td></td>
</tr>
</tbody>
</table>

* Lower values are best
Users of ReSound LiNX 3D hear up to 80% more of the sounds around them

- Depending on the direction of the speech, listeners performed at SNRs up to 19 dB better with ReSound than the other hearing aids.
- Considering speech presented from anywhere but in front, this translates to 80% more audibility & awareness with ReSound LiNX 3D.
- With the other hearing aids, speech and other sounds which may be of interest to the hearing aid users but are not in front are not audible, and users will not be able to shift their attention to them.

Source: Jespersen et al. (2016)

Users of ReSound LiNX 3D understand up to 40% more speech in noise

- Where the target speech was in front of the listener.
- In this condition, the binaural beamformer solutions gave a small advantage over LiNX3D, however, when the target voice came from other directional the advantage of LiNX 3D was very large.
- When the data from all presentation directions are collapsed, ReSound LiNX 3D has an overall advantage of 8.9 dB.
- Because of the difficulty of the speech test used, a conservative estimate of speech understanding improvement of 5% per dB suggests an advantage of 40 to 45% of speech understanding regardless of direction.

Source: Jespersen et al. (2016)
ReSound Spatial Sense processing

Pinna restoration applied (BTE & RIE) to accommodate for lost spectral characteristics due to microphone placement

Sound level at the hearing instrument microphone is recorded to determine the interaural level difference (ILD)

Data wirelessly exchanged between devices for compression compensation preserving the ILD

ReSound Spatial Sense: Improved localization of sounds

Restoring ILDs with Spatial Sense decreases front-back confusions for localization
Binaural Directionality III: Summary

Provides Spatial Cues for a 3D environment and localization in bilateral omnidirectional mode

Provides a better-ear strategy for understanding sounds from the front using either asymmetric directional or binaural directional depending on the listening environment

Provides an awareness strategy for sounds coming from the sides and back by using an optimized omnidirectional characteristic in asymmetric directional modes

Provides maximum speech understanding from the front in difficult listening situations when speech is not detected from the sides and back

All with high sound quality in all situations

ReSound Smart Fit

Enhance your clients fittings experience

Designed together with audiologists

More time for support and guidance
ReSound Smart 3D app

- One-tap access to all primary functions
- Quick buttons for easy sound personalization
- Enhance your clients’ hearing experience

Program overview
- Program carousel
- Program identification
- Volume options
- Global menu

Program card swipe
- Quick buttons
- Sound Enhancer incl. Tinnitus Manager
Enhance your clients' hearing experience

ReSound Smart 3D app

Guided onboarding and use
Optimization anywhere with ReSound Assist

Enhance your clients’ hearing experience
Remote fine-tuning importance
- in choice of hearing care professional

"I would definitely try another clinic"

MarketMinds, 2016

Hearing care wherever your clients are

Easy access for your clients directly from their ReSound Smart 3D app
Hearing care wherever your clients are

Any fine-tuning adjustments you can do in-office, you can also do remotely

That way you can spend less time scheduling appointments and more time supporting your clients
Thank you