Lyric3

Lyric3 Fitting Guide

PHONAK
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Precalculation based on NAL-NL2

- Industry standard, evidence-based fitting algorithm
- Modified for deep canal acoustics, microphone location effect and residual volume

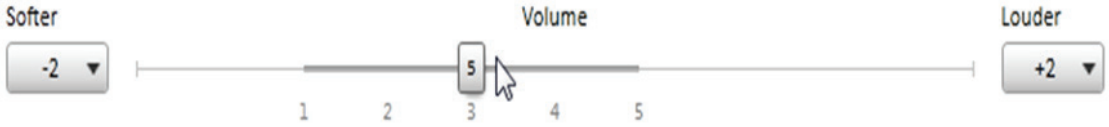
Lyric2 settings converted to closest-matching Lyric3 settings for experienced users

Volume

- Overall gain setting
- Fitter can select from 1-11 volume settings, and set the number of accessible Softer or Louder steps

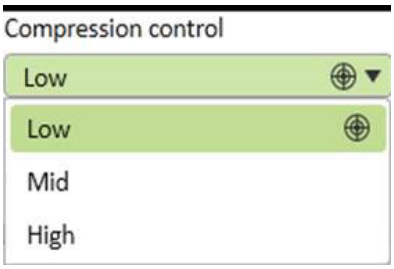
Patient can access up to 7 steps with SoundLync

Volume Steps	Approximate Range	Approximate Step Size
1-11	25 dB	2.5 dB SPL



Compression control

- Changes compression kneepoint
  - Low = lowest TK
  - High = highest TK (more linear)
- Impact depends on **[Volume]** setting



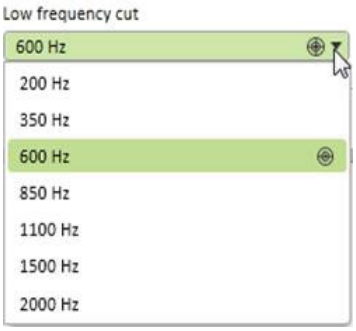
Volume	Compression control	Approximate TK
Low (e.g. 2)	Low High	70 dB 85 dB
Mid (e.g. 6)	Low High	60 dB 75 dB
High (e.g. 10)	Low High	50 dB 65 dB

Fine-tuning recommendations

Loud sounds	Too soft	Increase **[Compression control]** (move toward 'High' – more linear)
	Too loud	Decrease **[Compression control]** (move toward 'Low' – more compressive)
Soft sounds	Too soft	Increase **[Volume],** decrease **[Compression control]** (move toward 'Low')
	Too loud	Decrease **[Volume],** increase **[Compression control]** (move toward 'High')

Low frequency cut

- Decreases the amount of low frequency gain below chosen setting
- Primarily affects soft and medium level inputs

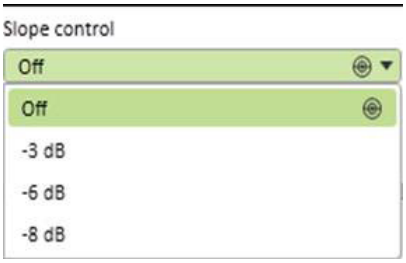


Fine-tuning recommendations

Compensate for insertion loss	Decrease **[Low frequency cut]** (move toward '200 Hz')
Adjust for over-amplification of low frequencies	Increase **[Low frequency cut]** (move toward '2000 Hz')

Slope control

- Provides attenuation for low and mid frequencies
- Configures shape of the frequency response
- Affects all input levels



Fine-tuning recommendations

Lack of fullness, thin sounding	Move **[Slope control]** toward 'Off'
Lack of clarity or sharpness	Increase **[Volume]** Move **[Slope control]** toward '-8'
Feedback	Decrease **[Volume]** Move **[Slope control]** toward 'Off'

Programming: Fine-Tuning

- Apply the methods mentioned in the previous section "Programming Overview".

- Once the device is programmed and in place, confirming Lyric's sound quality can be as easy as asking the patient questions related to volume and their own voice.

Volume

- Ask the patient "if you had a remote control, would you turn the volume up, down or leave it as it is?"
  - Based on the patient's response to this question you should set the **[Volume]** to where the patient is comfortable and then set the **[Louder]** volume setting to +1 or +2.
  - Changes to **[Compression control]** should be saved for complaints of background noise, soft sounds or pumping.

Own voice

- If the patient has complaints about his/her own voice:
  - Rule out physical placement/size. Did you reach the maximum insertion depth?
    If not, is it possible to decrease size to achieve deeper insertion depth?
    Is there a complete medial seal? If not is it possible to change size to achieve a complete seal?
  - Increase **[Compression control]** towards 'High'. Makes device more linear for average and loud sounds.
  - Lower **[Low-frequency cut]** toward '200 Hz'. Helps with insertion loss.
  - Move **[Slope control]** toward 'Off'. Helps with insertion loss.

If questions about volume and own voice related issues were addressed, the overall sound quality the patient is experiencing should be positive.

Feedback

Background

- The most common cause of feedback is an incomplete seal. Always check the physical fit of the device if there is feedback before re-programming.

Fitting Recommendations

- Inspect the ear canal with the device in place and the pinna at rest.
  - Check the placement of the device: Are there any gaps or folds?
    - **Gaps noted:** Re-size current size and 1 size larger (if available). Pay close attention to how the insertion depth interacts with the sizer. You may have to use a larger size at a more shallow depth. Be aware that reducing the depth of the insertion may contribute to occlusion, reduction in volume and sound quality issues.
    - **Folds noted:** Re-size current size and 1 size smaller (if available).
  - Check the angle of the device according to the orientation of the ear canal:
    - Should the superior indicator be towards the 2 o'clock position? 10 o'clock? Noon? If necessary change the position of the device according to the orientation of the ear canal.

- Is the canal wall touching or close to the microphone? If the inspection revealed no gaps or folds, a collapsing ear canal might be the cause:
  - Consider placing the device slightly short of ideal depth of insertion to 'prop' the ear canal open.
  - Be aware that reducing the depth of the insertion may contribute to occlusion, reduction in volume and sound quality issues.

- Did the device migrate? See Migration Section (page 7).

- Is there cerumen adjacent to the lateral end of the device? If yes, replace with the new device to the same depth of insertion.

- Fine-Tuning:
  - Decrease **[Volume]** (move slider to the left).
  - If more gain is needed for average and loud sounds, increase **[Compression control]** toward 'High'.
  - Or, try adding gain to the low and mid frequencies:
    - Move **[Slope control]** toward 'Off' direction.
    - Decrease **[Low frequency cut]** setting (move towards '200 Hz' direction).
  - If feedback persists, may need to try a larger device.

Migration

Background

- Migration is defined as the Lyric device moving from the original insertion depth. Migration can occur immediately after the patient has been fit with the device or a sizer, or may take a few hours up to a couple of days after the patient has left the office.

- Migration is considered significant when sound quality is compromised, feedback occurs or patient comfort is negatively impacted.

- Common causes of migration:
  - Patient manipulation:
    - Counsel patient on how to "scratch" ear by rotating anterior to tragus.
    - Avoid pushing on ear from behind.
  - Over lubrication of external auditory canal:
    - Change lubrication technique, lightly lubricate canal wall only.
    - Use sterile/distilled water instead of glycerin.
  - Excessive TMJ movement:
    - Have patient open and close jaw with device/sizer in place and observe movement.
    - Do you have flexibility with insertion depth?
    - Upsizing the device often anchors device in canal.
  - Under-sizing the device:
    - In effort to make device more comfortable, many providers tend to go with the smallest device possible without feedback, leading to slippage or migration.
    - Upsize the device by one size to provide a more secure fit.

Fitting Recommendations

- Check the placement of the device: Are there any gaps or folds?
  - **Gaps noted:** Re-size current size and 1 size larger (if available). Pay close attention to how the insertion depth interacts with the sizer. You may have to use a larger size at a more shallow depth. Be aware that reducing the depth of the insertion may contribute to occlusion, reduction in volume and sound quality issues.
  - **Folds noted:** Re-size current size and 1 size smaller (if available).
  - Check the angle of the device according to the orientation of the ear canal:
    - Should the superior indicator be towards the 2 o'clock position? 10 o'clock? Noon? If necessary change the position of the device according to the orientation of the ear canal

- Inspect the ear canal while the patient opens and closes jaw and determine if there is excessive jaw movement.
  - Determine the current depth of the device using the Lyric insertion tool.
    - To do so, gently grasp the handle of the device with the forceps and move the depth ring so that it lines up with the posterior meatus. Remove the tool and make note of the measurement.

- If migration is "significant", follow these steps:
  1. Remove the device and re-evaluate the device size with sizers.
  2. Determine if a larger size will allow the device to fit more securely.
  3. Determine if changing insertion depth will also allow a more secure fit.
  4. If jaw movement was the cause of migration, be sure to inspect jaw movement with the sizer in place.

Occlusion

Background

- There are two types of occlusion associated with hearing aid fittings:
  - "Physical occlusion" is caused by device placement. As long as an acoustic seal in the bony portion of the ear canal is achieved, the patient should not experience physical occlusion.
  - "Acoustic occlusion" is caused by under-amplification of low frequencies (insertion loss from device placement), or giving over-amplification of low frequencies (sounds and own voice have too much bass).

Fitting Recommendations

- Before troubleshooting determine the type of occlusion
  - Does the patient feel occluded with the device turned OFF? Try turning the device to SLEEP mode or OFF.
  - If yes, this is truly a physical occlusion.
  - If no, this could be acoustic occlusion.

- Physical Occlusion
  - With physical occlusion, the patient can often "feel" footsteps resounding in ears/head
  - Did you reach the maximum insertion depth?
    - If not, decrease seal size to attempt to achieve deeper insertion depth.
  - Is there a complete medial seal?
    - If not, increase device size to achieve a complete seal.

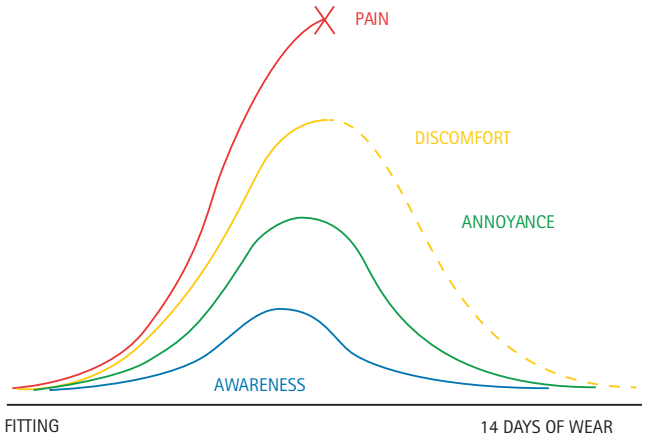
- Acoustic Occlusion
  - With acoustic occlusion, the patient will often report an improvement in the situation when you turn the device off.
  - Under-amplification of low-frequencies or insertion loss.
    - Decrease **[Low frequency cut]** toward '200 Hz'.
    - Move **[Slope control]** toward 'Off'.
  - Over-amplification of low-frequencies.
    - Decrease **[Low frequency cut]** toward '2000 Hz'.
    - Move **[Slope control]** toward '-8'.
    - In combination with these options you may need to increase **[Volume]** depending on patient needs.
    - Increase **[Compression control]** towards 'High'. Makes device more linear for average and loud sounds.

- If you have tried the above recommendations and the patient still reports occlusion, counsel on awareness and acclimatization period (see next page).

Discomfort and Pain

Background

- Determine the level of discomfort/pain from the patient. Refer to the pain scale show below (Note: these are typical findings; individual patient responses may vary):



  - Awareness – will typically recover within 14 days.
  - Annoyance – will typically recover within 14 days.
  - Discomfort – will typically resolve within 7 days of wear.
  - Pain – is not expected to recover and the device should be removed.

- If the patient reported pain:
  - Immediately remove the device and inspect the ear canal.
    - Prior to removal, determine the insertion depth of the device to determine if the device has migrated. If migration has occurred, also see Migration section (page 7) and use tips prior to re-insertion.
    - If an office visit is not possible, advise patient to self-remove.
  - Evaluate ear canal health
    - Check for redness, abrasion, hematoma.
    - If the "footprint" is deep into the ear canal (towards the medial end of the device) verify the canal length. In some cases you may need to place the device 1mm more shallow.
    - If the "footprint" is located on the posterior/anterior/inferior/superior portion of the ear canal, check the angle of insertion.
    - Medical referral if necessary and report in Target/ALPS.
  - If abrasion or hematoma is noted, indicate "refit after rest ok" and allow min. 10-14 days before inserting another device.
  - Once healthy, verify size and re-fit. If pain returns on the second fitting, contraindication may be warranted.
    - Analysis has shown that multiple sizes & multiple insertion depths do not alleviate pain and ultimately results in trial cancellation.

Non-working Devices

If the device is still in the ear

- Use SoundLync to change device settings. Does the patient hear the beep?
  - If yes, how many beeps?
    - 1 beep: Device was in SLEEP mode / OFF.
    - 2 beeps: Device is now in SLEEP mode. Turn it back ON (1 beep).
    - Verify that there is adequate gain.
  - If no, please try the following:
    - Attempt to reprogram the device while in the ear.
    - If not successful, remove the device and replace with a new device.

Once the device is removed

- Use the following tips to help investigate the cause of the device failure.
  - Visually inspect the device:
    - Is debris blocking the microphone/receiver?
    - Is the device wet?
  - Has the yellow color of the device faded? This would indicate repeated water exposure.
  - Check that water is not trapped in the protection tube.
    - If there is water, counsel patients to roll-up a soft tissue and dab the canal opening and device following a water event.

Before re-inserting any device

- Check if cerumen is present in the ear canal.
  - Perform or refer out for cerumen management.
- Check if the ear canal is healthy.
  - If yes, replace with the new device to the same depth of insertion.
  - If no, rest for 10-14 days until healthy and replace with a new device of the same size in the ear.
- Take time to visualize the entire ear canal to determine the "flight path" for device placement.
- When re-inserting the device lubricate the opening of the canal.