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One Size Does Not Fit All

Selecting and Fitting Devices for Tinnitus Management

Jennifer Martin, AuD
National University of Singapore
Audiology Online July 2016

Learning Outcomes

- Define the role of sound therapy as part of the tinnitus/sound sensitivity management plan.
- Explain when each type of device (hearing aid, sound generator, combination unit) would be used as part of the management plan for patients with tinnitus and sound sensitivity.
- Describthe differences between fitting hearing aids for hearing loss and fitting hearing aids for tinnitus and sound sensitivity management.

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Recommended Components of Tinnitus Management

- 1) Education & Counseling
- 2) Stress reduction & Relaxation
- 3) Therapeutic sound

Hoare et al. (2014)

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Sound Therapy

- "Any use of sound where the intention is to alter the tinnitus perception and/or the reactions to tinnitus in a clinically meaningful way" Hoare et al. (2014)
- "using external sounds to provide relief from tinnitus" Folmer & Carroll (2006)
- "sound is used to directly or indirectly shift attention away from the tinnitus"

Henry et al. (2008)

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Sound Therapy

- Very broad area
- Use the general guidelines of sound therapy
- Focus on the use of ear level devices as part of the sound therapy strategy

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General Guidelines of Sound Therapy

- Low level sound that is not bothersome
- Should not interfere with communication or concentration
- Reduces the contrast between the tinnitus and the environment

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Therapeutic Sound

- Environmental sound
- Music
- Speech

Henry et al. (2008)

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Purposes of Therapeutic Sound

- Sense of relief from tinnitus-related stress (soothing sound)
- Passive diversion from tinnitus (background sound)
- Active diversion from tinnitus (interesting sound)

Henry et al. (2008)

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Devices for tinnitus management

- Sound Generators
- Hearing aids
- Combination units

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Devices for tinnitus management

- Sound Generators
  - Ear level devices
  - No amplification
  - Some have multiple sound options
  - Some are programmable
  - Various styles
  - Less expensive than hearing aids

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Devices for tinnitus management

- Hearing aids
  - Amplification only
  - Wireless devices to stream sounds

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Benefits of Amplification

- Improved ability to hear soothing sound, background sound and distracting sound to provide relief from tinnitus and tinnitus-related stress
- Reduction in tinnitus loudness
- Less stress associated with straining to hear
- Stimulation of the auditory system

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Devices for tinnitus management

- Combination units
  - Amplification only
  - Sound generator only
  - Combination of both
  - Can also use wireless devices to stream sounds

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Considerations: Device Type

- Hearing Aid versus Combination Unit
  - Starting Point:
    - HA for normal hearing to mild HL in LF
    - CU for greater than mild LF loss

McNeil et al. (2012)

- Always be open to trying both to allow patient to decide what works best for them
- Current technology: order combination unit and use features as needed

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Considerations: Device Style

- Open fit
  - Slim tube BTE
  - Receiver in the ear
- If hearing loss is too great for open fit, then use maximum venting possible

Searchfield (2006)

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Considerations: Monaural vs Binaural

- Binaural fitting for binaural hearing loss, even if the tinnitus is only present unilaterally
  - Provides more normal auditory balance

Searchfield (2006)

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Considerations: Prosthetic vs Therapeutic

- Most hearing aids are fit prosthetically
  - Fitting to replace the lost hearing
  - Focus on communication
- Tinnitus often requires fitting therapeutically
  - Changes are made to the programming to allow the hearing aid to have more effect on the tinnitus perception

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Considerations: HL vs Tinnitus

- Which is the BIGGER problem?
  - HL: Fit for the hearing loss and patient's communication needs
    - Tinnitus benefit is secondary goal
  - Tinnitus: Fit primarily for tinnitus relief
    - Improved communication ability is secondary goal
- Can set two programs if needed
  - 1 for better hearing ability
  - 1 for better tinnitus relief

Henry et al. (2008)

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Considerations: Acoustic Programming

- Use feedback reduction for most open fit
- Disable internal noise reduction (expansion)
- Disable environmental noise reduction
- Low compression knee point
- Omnidirectional microphone setting
- Fitting protocol: DSL I/O v5

Searchfield (2006)
Henry et al. (2010)
Wise (2003)

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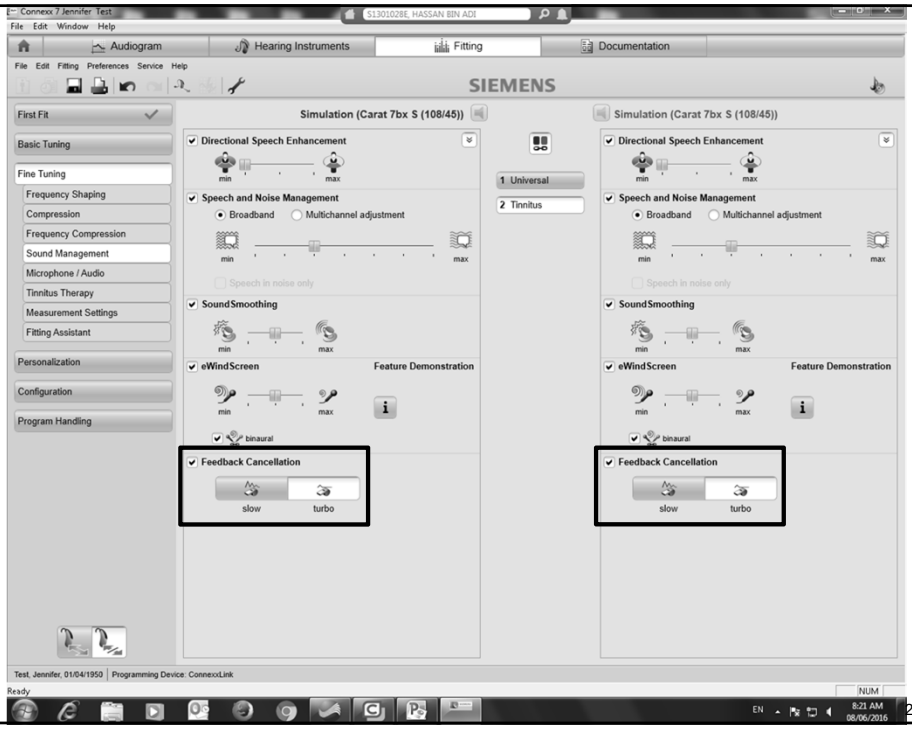

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Searchfield (2006)
Henry et al. (2010)
Wise (2003)

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Searchfield (2006)
Henry et al. (2010)
Wise (2003)

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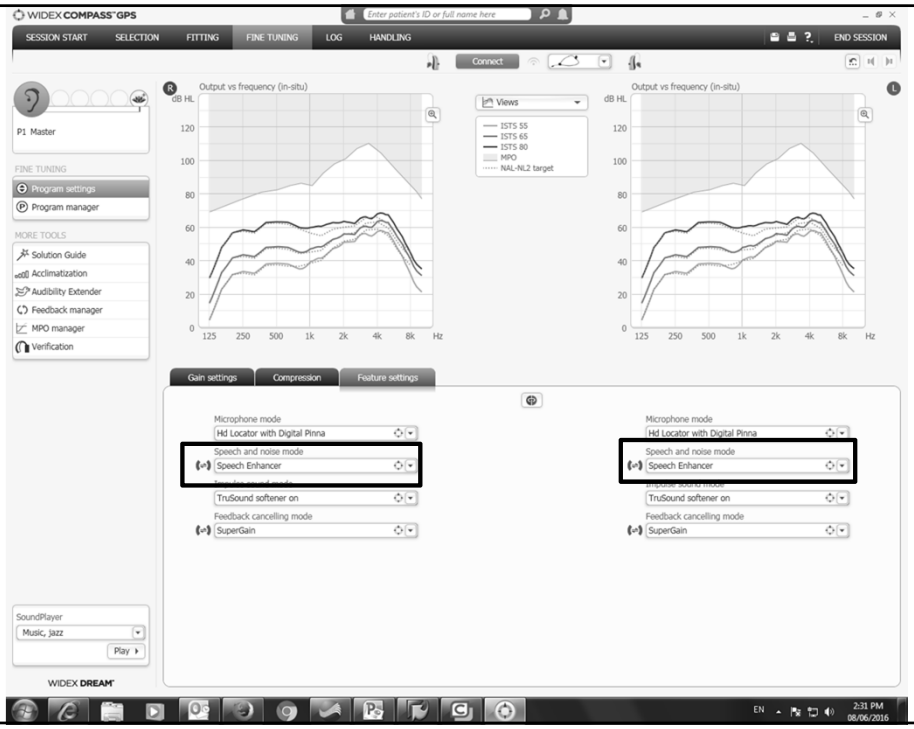

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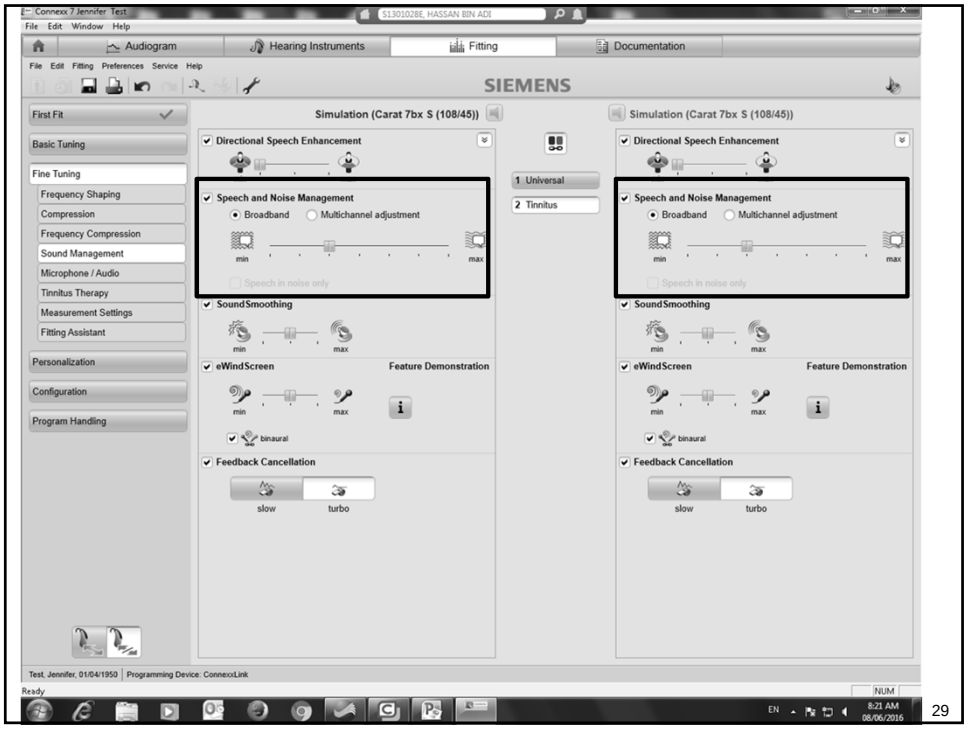
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Microphone / Audio
Tinnitus Therapy
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Fitting Assistant
Personalization
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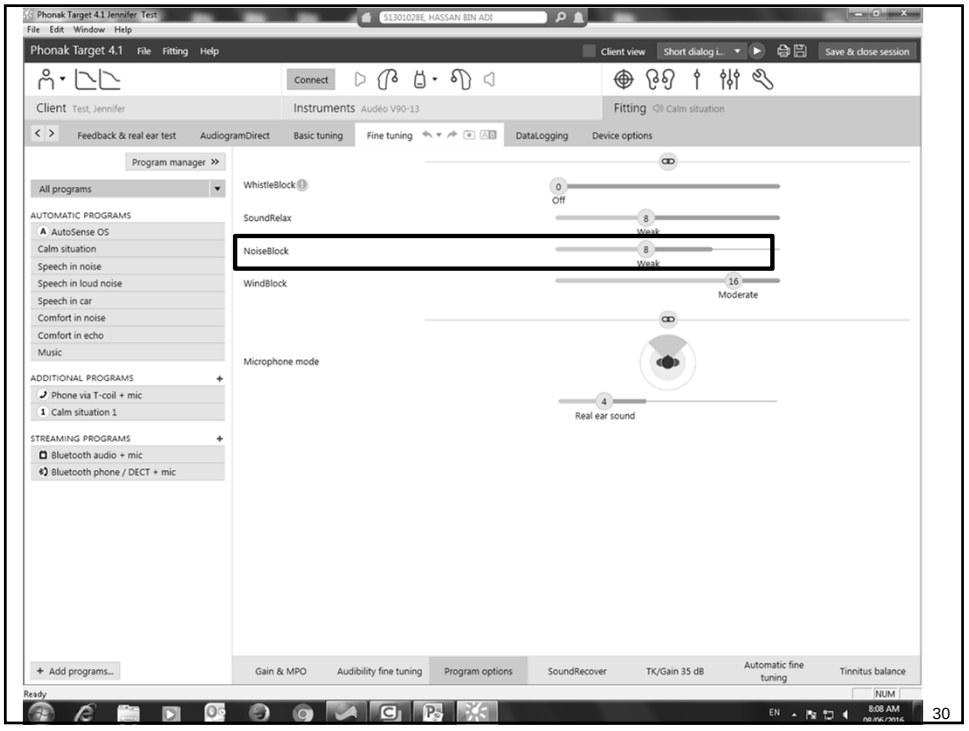
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Considerations: Acoustic Programming

- Use feedback reduction for most open fit
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- Disable environmental noise reduction
- Low compression knee point
- Omnidirectional microphone setting
- Fitting protocol: DSL I/O v5

Searchfield (2006)
Henry et al. (2010)
Wise (2003)

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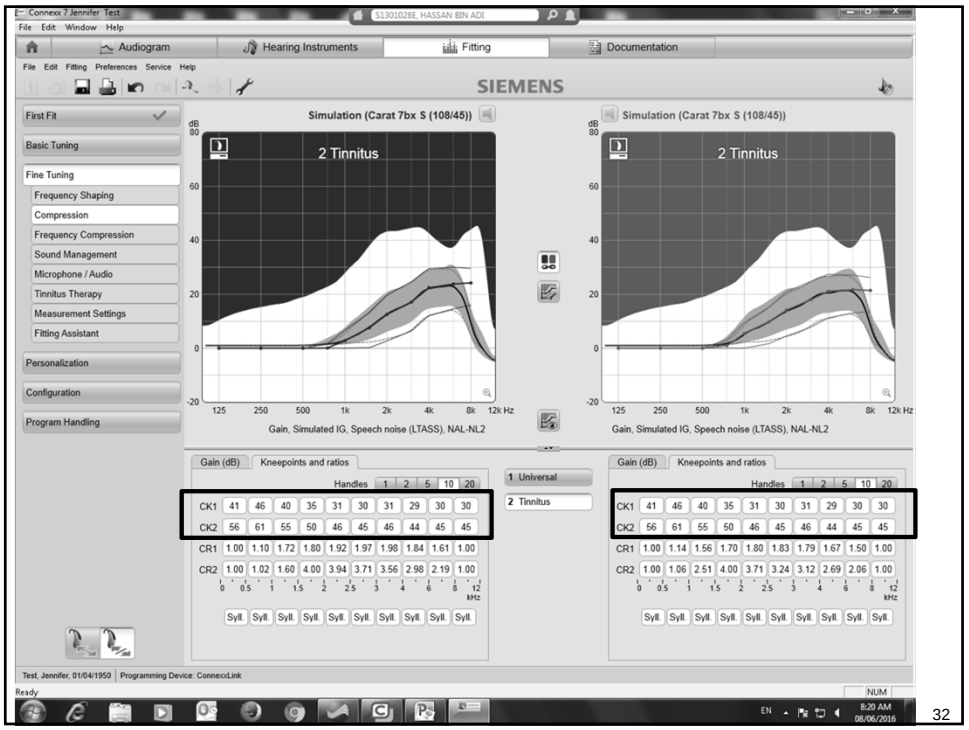

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Considerations: Acoustic Programming

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Searchfield (2006)
Henry et al. (2010)
Wise (2003)

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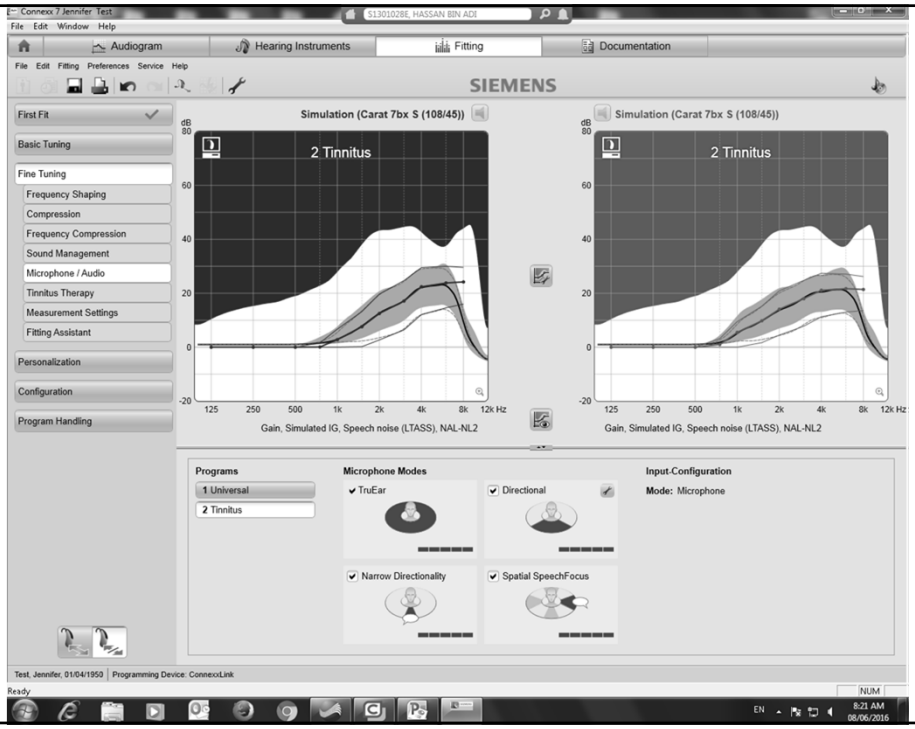

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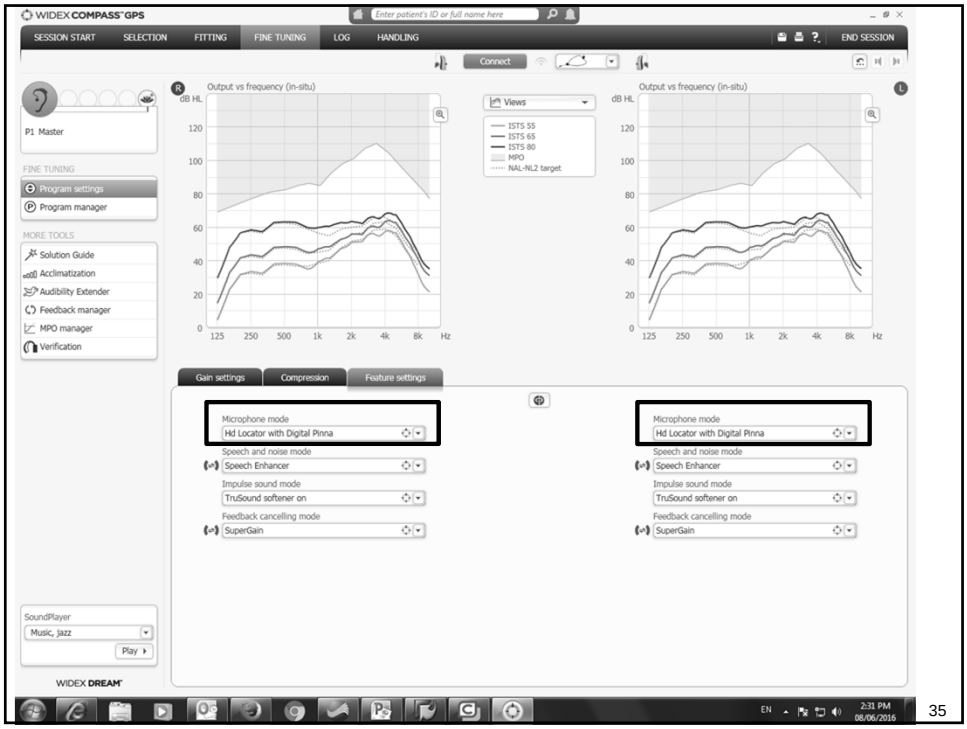
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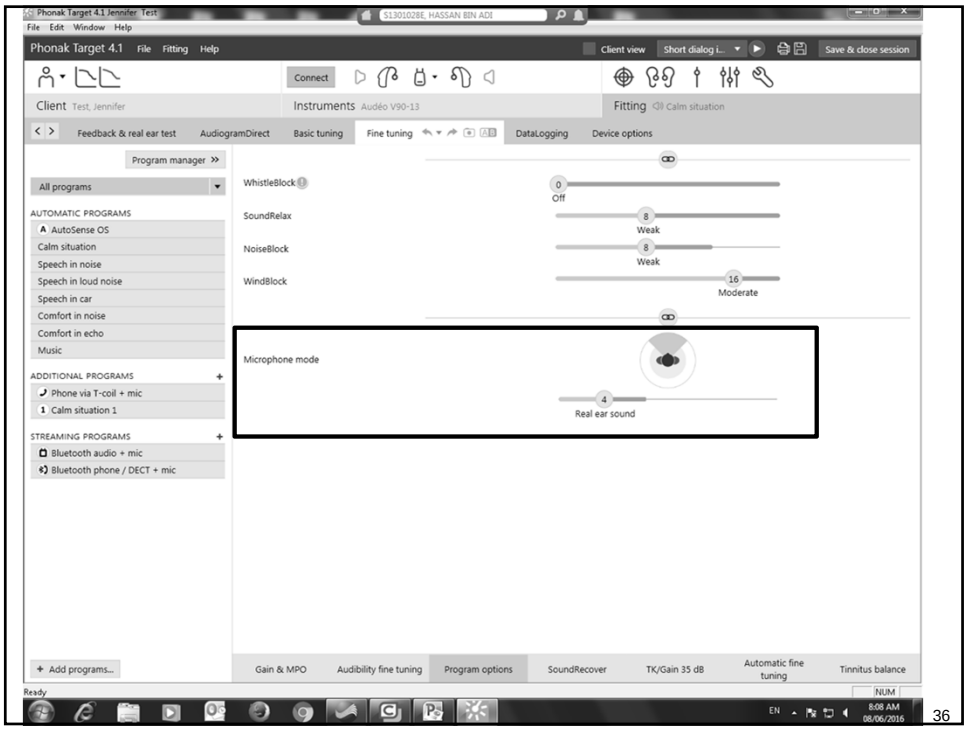
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Audibility fine tuning
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SoundRecover
TK/Gain 35 dB
Automatic fine tuning
Tinnitus balance
Ready
8:08 AM
08/06/2016

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Considerations: Acoustic Programming

- Use feedback reduction for most open fit
- Disable internal noise reduction (expansion)
- Disable environmental noise reduction
- Low compression knee point
- Omnidirectional microphone setting
- Fitting protocol: DSL v5 versus NAL-NL2

Searchfield (2006)
Henry et al. (2010)
Wise (2003)

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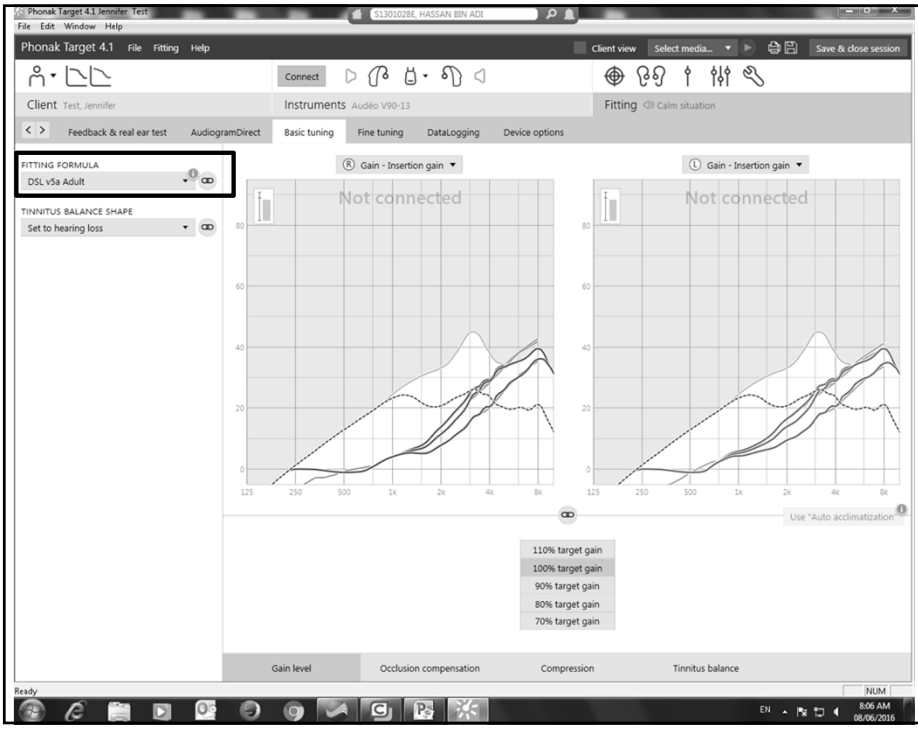

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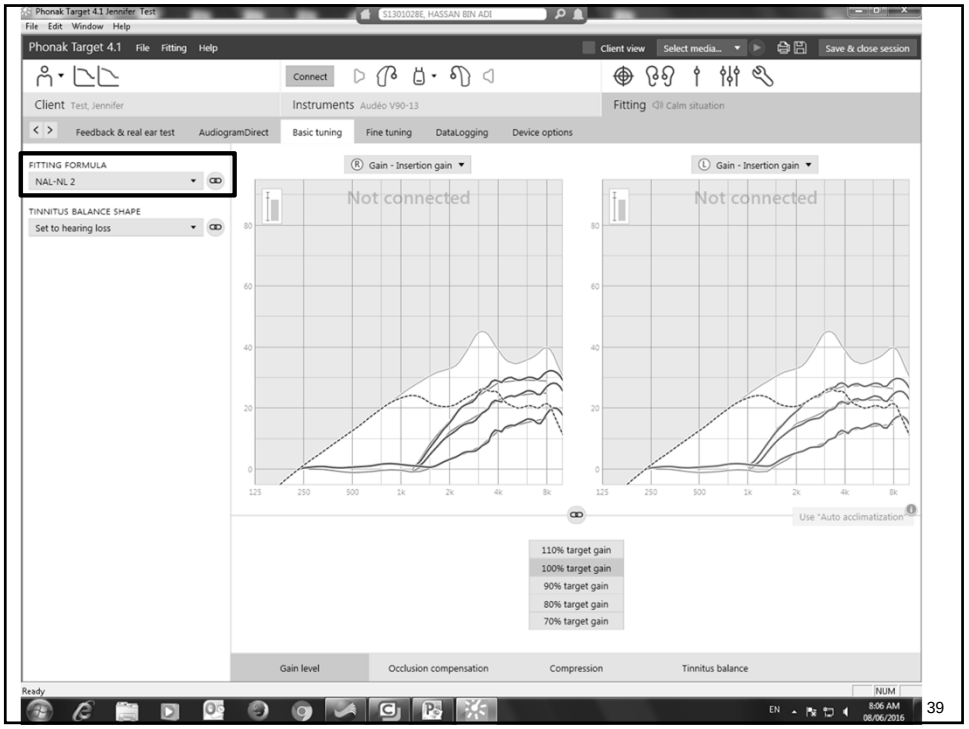
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Tinnitus balance

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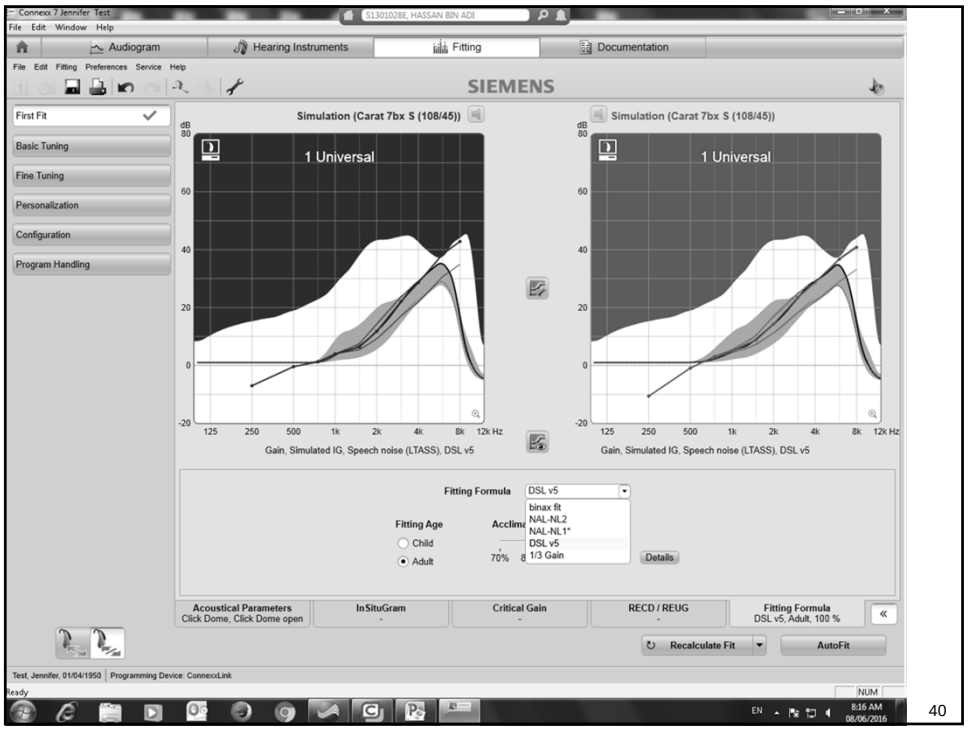
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Program Handling
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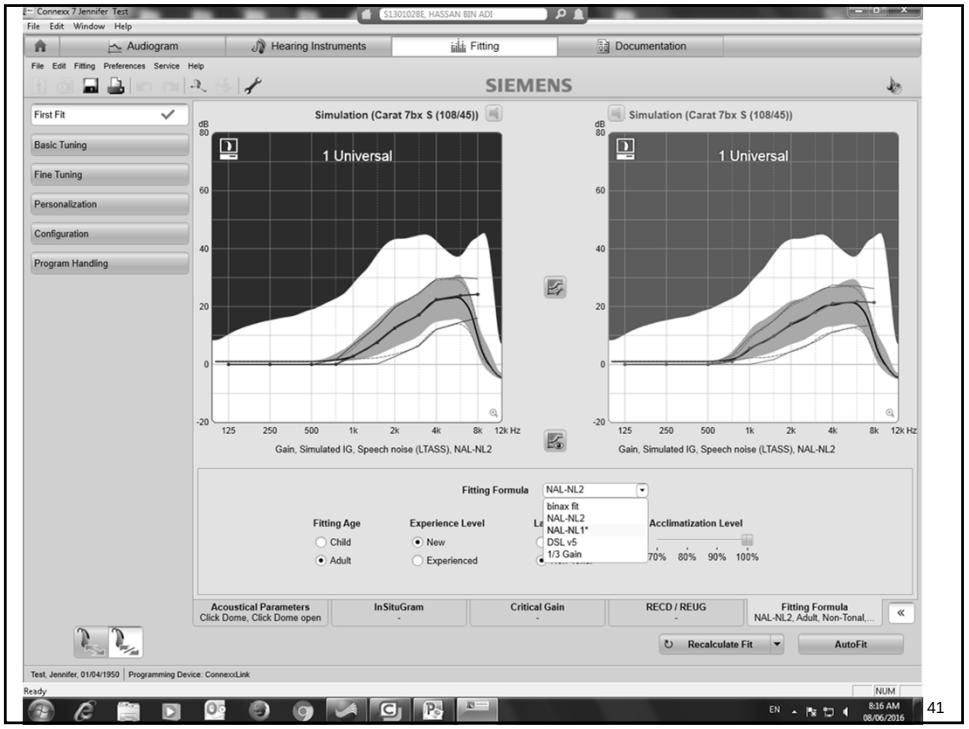
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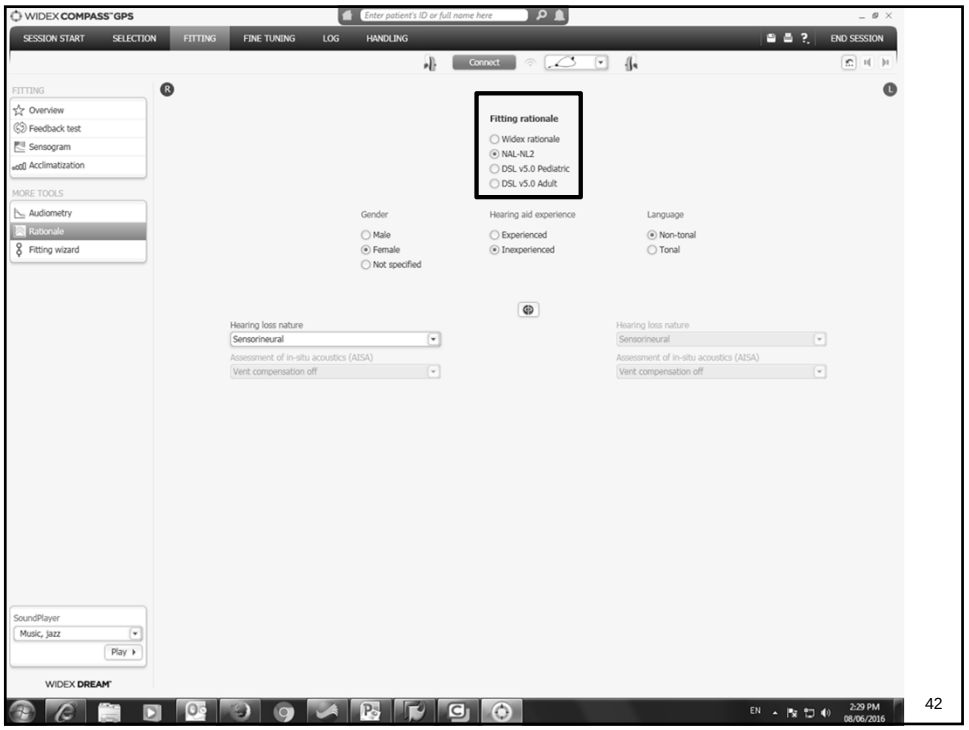
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Non-tonal
Tonal
Hearing loss nature
Sensorineural
SoundPlayer
Music, jazz
Play
WIDEX DREAM

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Considerations: Sound Sensitivity

- Sound Generator versus Hearing Aid/Combination Unit
- Occlusion versus Venting

Searchfield (2006)

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Considerations: Sound Sensitivity

- Programming modifications
  - Low compression knee point + higher than normal compression ratio
    - Use hearing aid as amplifier and limiter
    - As sound sensitivity improves, compression ratios can gradually be reduced
- Reduce maximum power output (MPO)

Searchfield (2006)

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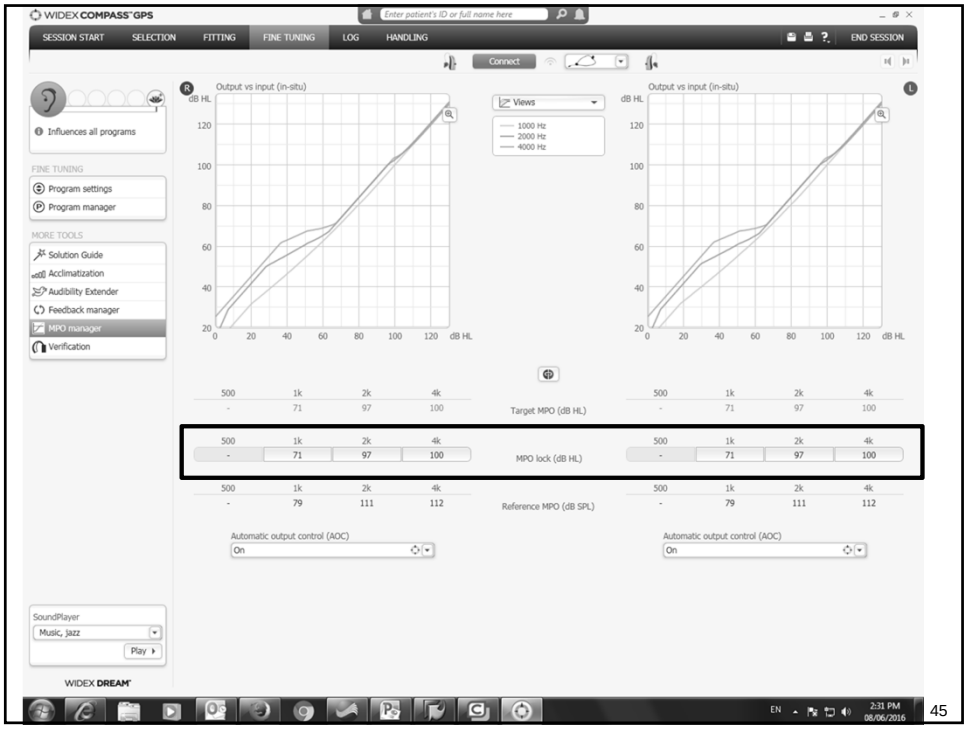
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Solution Guide
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Audibility Extender
Feedback manager
MPO manager
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2000 Hz
4000 Hz
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Reference MPO (dB SPL)
Automatic output control (AOC)
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SoundPlayer
Music, jazz
Play
WIDEX DREAM

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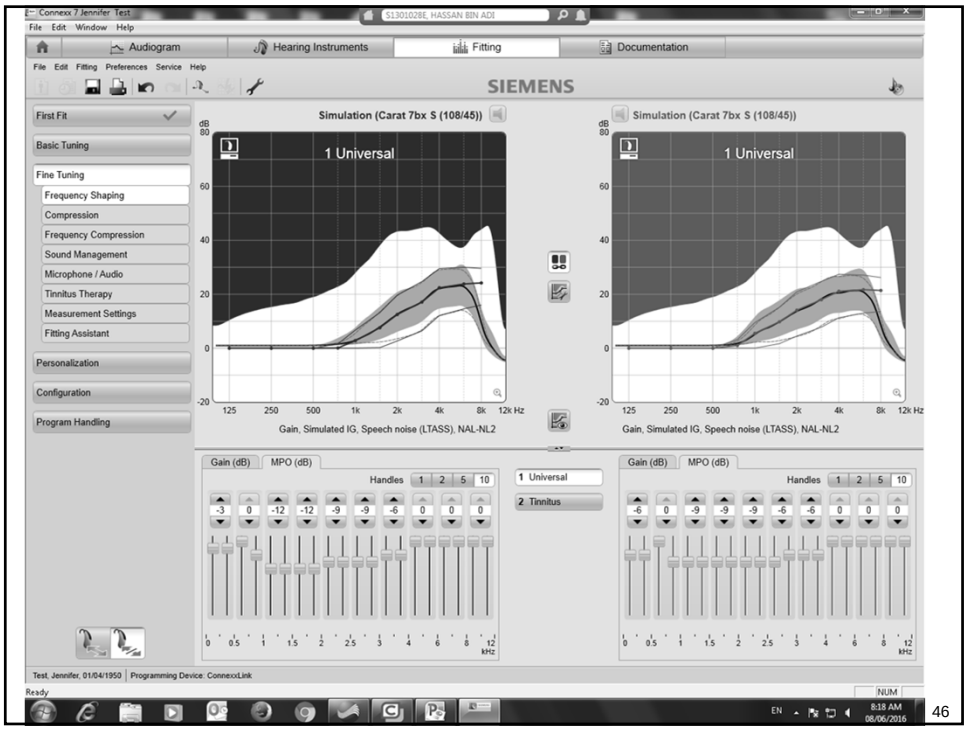
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MPO (dB)
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1 Universal
2 Tinnitus

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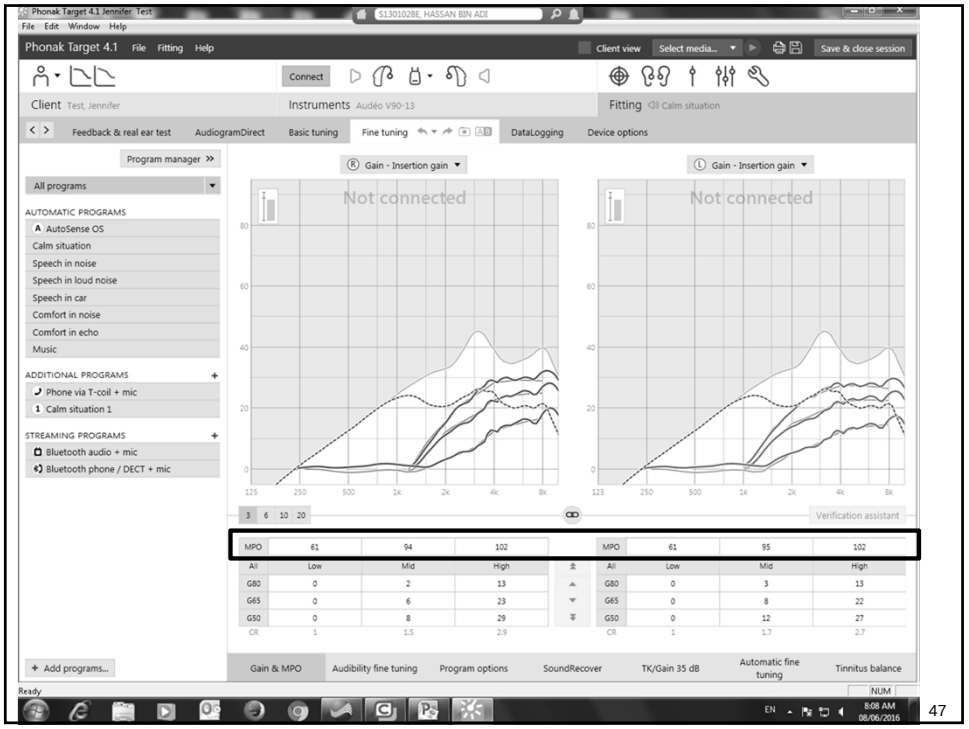

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Special Considerations

- Each tinnitus patient is unique and requires individualized care/empathy
- Tune devices to meet the patient's individual hearing, tinnitus and comfort needs
- Perform probe microphone measurements to verify acoustic fit
- Multi-disciplinary care is best
- Know when to refer to a tinnitus specialist

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References

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