Learning Objectives

Identify the major assumptions that underpin the standard fitting approaches used in audiology.

Explain how fitting algorithms have been developed.

Describe the foundation of the residual capabilities approach to fitting amplification.
Why?

What is a “Standard Fitting”?
What is a “Standard Fitting”?

- Mild-to-moderate, Moderate SNHL
- Flat to Gently Sloping
- Symmetrical HTLs and WRS
- Good WRS in Quiet
- Stable
- Presbyacusis, maybe with a little NIHL

Assumptions when fitting hearing aids:
Assumptions when fitting hearing aids:

- Prescriptive, not Adaptive

The Prescriptive Process

Input Data → Prescription → Fine Tuning
Assumptions when fitting hearing aids:

- Prescriptive, not Adaptive
- Restore Audibility
- Correct for Threshold Loss
An Example Rationale

- If HTL > 50 \( \Rightarrow UCL = 100 + \left( \frac{HTL - 50}{2} \right) \)
- Else \( UCL = 100 \)

- \( MCL = \frac{UCL - HTL}{2} \)

- \( \text{Gain}_{65} = MCL - 65 \)

- \( CR = \frac{100}{UCL - HTL} \)

- \( \text{Gain}_{50} \ & \text{Gain}_{80} \gg \gg \gg \gg \gg \rightarrow \text{Gain}_{65} \) modified by the CR
Assumptions when fitting hearing aids:

- Prescriptive, not Adaptive
- Restore Audibility
- Correct for Threshold Loss
- Measurable Hearing is Useable Hearing
- Make the Full Range of Inputs Fit
- The More Bandwidth the Better

How do we describe a patient’s auditory status?

- By the audiogram
- By the physiological condition of the ear
What do we assume about SNHL?
What else has to go right?

What do you see?
Assumptions when fitting hearing aids:

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- Restore Audibility
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Assumptions when fitting hearing aids:

- Prescriptive, not Adaptive
- All Speech is Valuable*
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- Targets are the Sweet Spot
- Correct for Threshold Loss
- Fine Tuning is a Movement Away from Optimal
- Measurable Hearing is Useable Hearing
- Fit to Intelligibility, Fine Tune to Satisfy Sound Quality
- Make the Full Range of Inputs Fit
- The More Bandwidth the Better
Frequency Response & Speech Understanding

\[(van\ Buuren,\ Festen\ &\ Plomp,\ 1995)\]
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- Make the Full Range of Inputs Fit
- Both Ears Contribute (Equally)
- The More Bandwidth the Better
- Two Monaural Fittings

*(van Buuren, Festen & Plomp, 1995)*
Basics of Hearing

Despite two ears, we hear one image

Assumptions when fitting hearing aids:

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When can these assumptions lead you astray?
aaarrrrr!
Residual Capabilities

Aided signal viewed in relation to remaining auditory abilities
Inner Hair Cells

Normal  Damaged  Aided

Yost & Nielsen, 1985
Models of Intervention

- “Hearing Loss Correction”
  compensation for threshold loss
  gain provided proportional to HTL

- “Residual Capabilities”
  aided signal viewed in relation to remaining auditory abilities
Two Keys to Fitting Amplification:

- How can they use the hearing that they have?
- What are they using their hearing to do?
Exception Discovery

“Young men know the rules . . . Old men know the exceptions”

Oliver Wendell Holmes

Complex versus Standard Fittings: Part 1

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