Asymmetrical Sensorineural Hearing Loss:

Fitting Strategies

Donald J. Schum, PhD
Vice President, Audiology & Professional Relations
Oticon, Inc.

DJS@Oticonusa.com

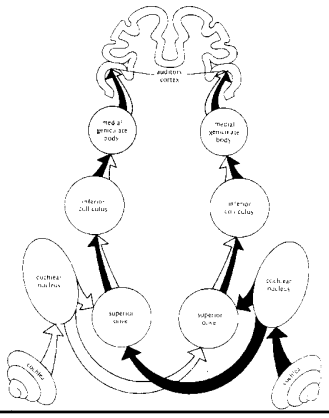
Agenda

- Binaural Hearing
- Asymmetrical SNHL
- Assumptions of Typical Fittings
- Types of Asymmetrical Profiles
- Fitting Suggestions (not rules)
- Outcome Measures
- Case Examples

Agenda

- Binaural Hearing
- Asymmetrical SNHL
- Assumptions of Typical Fittings
- Types of Asymmetrical Profiles
- Fitting Suggestions (not rules)
- Outcome Measures
- Case Examples

Ascending Auditory Pathways

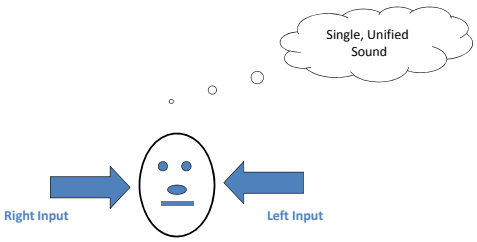


What Does the Brain Look For?

- Amplitude from both sides
- Frequency from both sides
- Arrival time at both sides

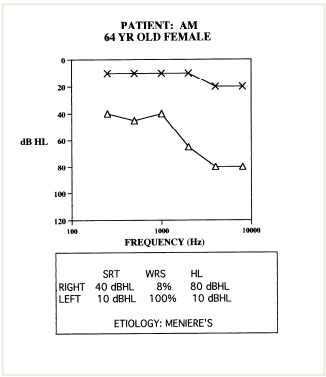
Basics of Hearing

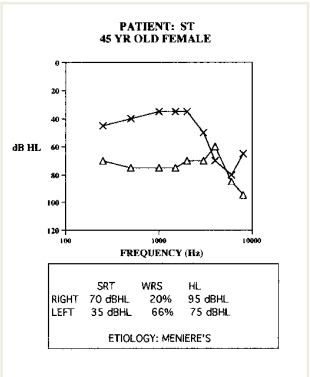
- Despite two ears, we hear one image

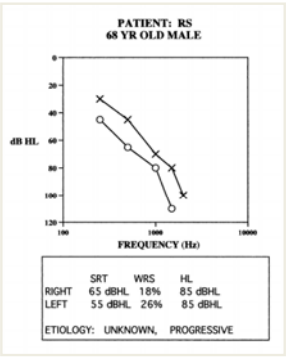


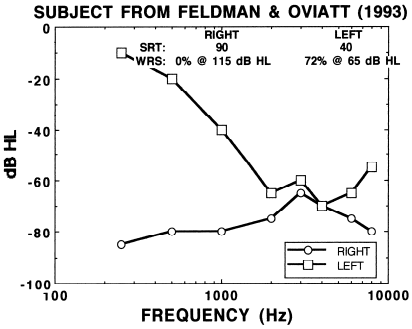
Agenda

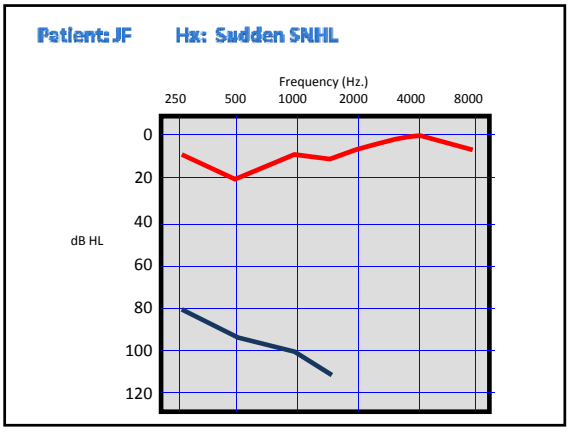
- Binaural Hearing
- Asymmetrical SNHL
- Assumptions of Typical Fittings
- Types of Asymmetrical Profiles
- Fitting Suggestions (not rules)
- Outcome Measures
- Case Examples

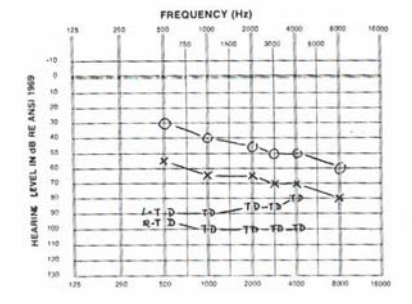





PATIENT: RS
68 YR OLD MALE
dB HL
FREQUENCY (Hz)
SRT WRS HL
RIGHT 65 dBHL 18% 85 dBHL
LEFT 55 dBHL 26% 85 dBHL
ETIOLOGY: UNKNOWN, PROGRESSIVE


SUBJECT FROM FELDMAN & OVIATT (1993)
RIGHT
LEFT
SRT: 90 40
WRS: 0% @ 115 dB HL 72% @ 65 dB HL
dB HL
FREQUENCY (Hz)
RIGHT
LEFT


Patient: JF
Hx: Sudden SNHL
Frequency (Hz.)
dB HL



Sandlin, 1994

Agenda

- Binaural Hearing
- Asymmetrical SNHL
- Assumptions of Typical Fittings
- Types of Asymmetrical Profiles
- Fitting Suggestions (not rules)
- Outcome Measures
- Case Examples

Assumtions

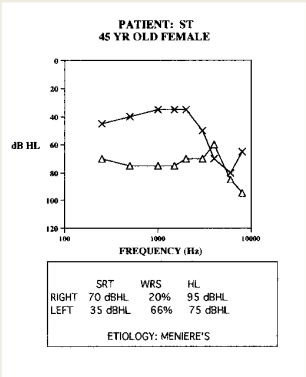
- Full audibility
- Measurable hearing is usable hearing
- Binaural fittings
  - Same time
  - Both ears used in the same way
  - Both ears equal partners
  - Full prescription, both ears

Agenda

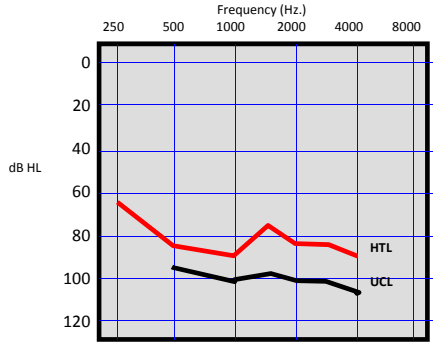
- Binaural Hearing
- Asymmetrical SNHL
- Assumptions of Typical Fittings
- Types of Asymmetrical Profiles
- Fitting Suggestions (not rules)
- Outcome Measures
- Case Examples

Types of Asymmetries

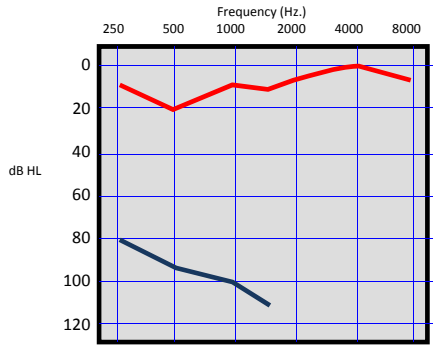
- Both ears reasonably aidable, one better
- One dead, one aidable
- One normal, one aidable



Patient: GC Right Ear Left Ear Dead (Hx: Meniere's)



Patient: JF Hx: Sudden SNHL

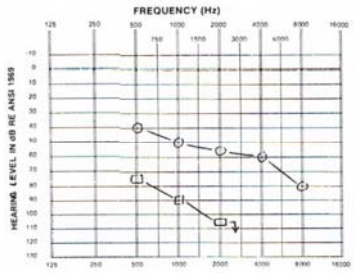


Agenda

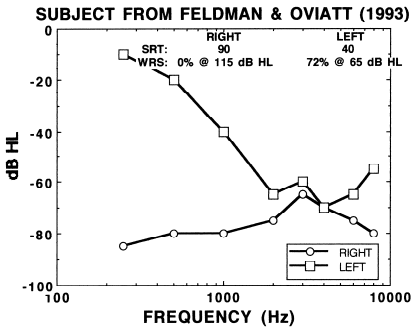
- Binaural Hearing
- Asymmetrical SNHL
- Assumptions of Typical Fittings
- Types of Asymmetrical Profiles
- Fitting Suggestions (not rules)
- Outcome Measures
- Case Examples

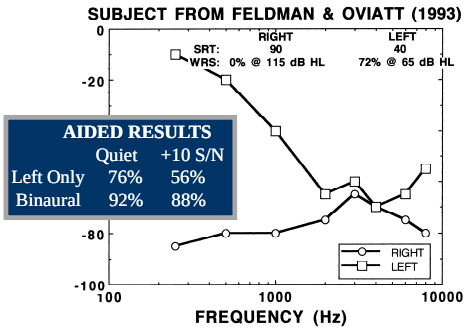
Fitting Suggestions

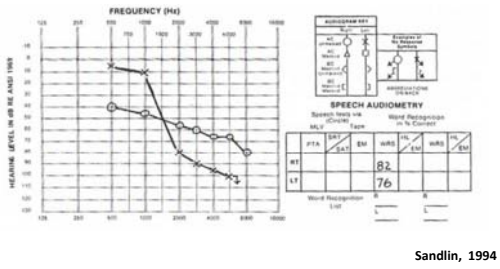
- Don't say "no" until you know



Sandlin, 1994







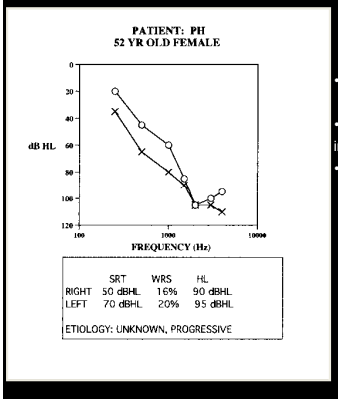
Sandlin, 1994

Fitting Suggestions

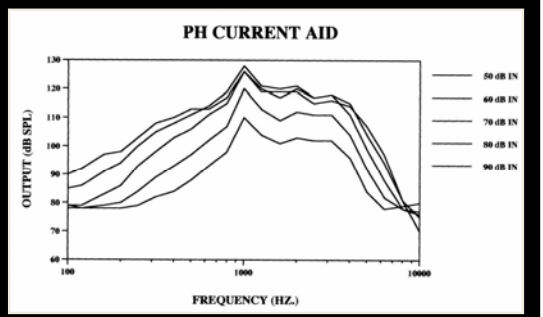
- Don't say "no" until you know
- Aim for a fused, binaural image

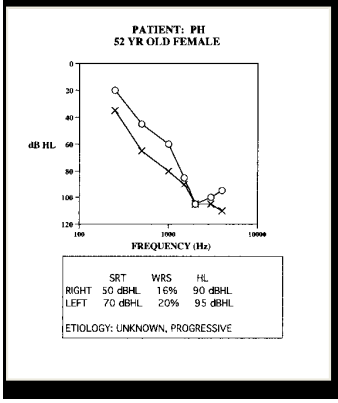
Fitting Suggestions

- Don't say "no" until you know
- Aim for a fused, binaural image
- Targets only a place to start . . . Don't be surprised by less gain to the poorer ear

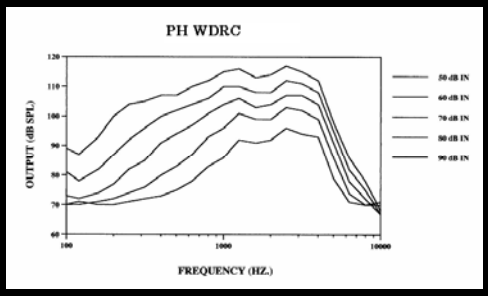


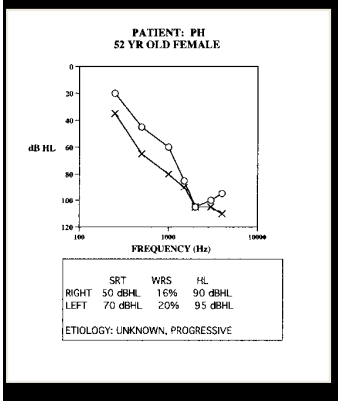
- Power, linear fitting bilaterally
  - 35-50 dB REIG
- Left aid useful, right hindrance in any amount of competition
- Aided WRS (55 dB HL & + 10 S/N):
  - 34% Left only
  - 10% Right only
  - 24% Bilateral





- Refit with MCNL Right
  - 35-40 dB REIG
  - CR: 3:1

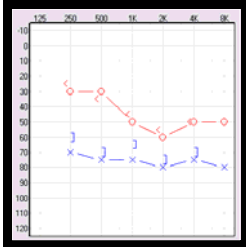




- Refit with MCNL Right
  - 35-40 dB REIG
  - CR: 3:1
- Aided WRS (55 dB HL & +10 S/N)
  - 26% Right only
  - 42% Bilaterally

Fitting Suggestions

- Don't say "no" until you know
- Aim for a fused, binaural image
- Targets only a place to start . . . Don't be surprised by less gain to the poorer ear
- Consider Serial Fittings



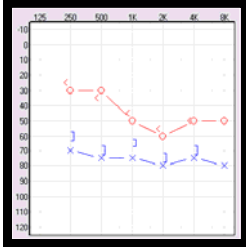
WRS Right: 80% @ 70 dB HL
WRS Left: 24% @ 90 dB HL

Pt: Ms. G.J.

42 yr. old with stabilizing Meniere's.

Vestibular symptoms under control and hearing has been stable for past 6 months.

Ready to start with hearing aids.



WRS Right: 80% @ 70 dB HL
WRS Left: 24% @ 90 dB HL

Pt: Ms. G.J.

Audiologist started with nonlinear power in right ear (to protect against future threshold losses).

After two months of adjustments and adaptation, added another matched HA on the left (assumed probably would not need a full super power given the etiology and that this is the "secondary" ear).

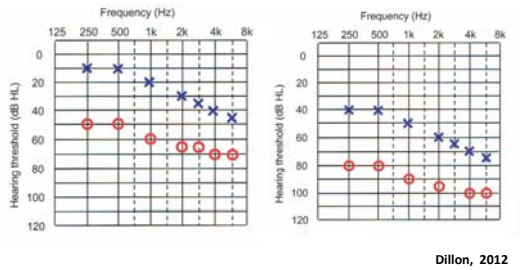
Prepared to switch to super power if seemed week, but patient used far less gain than expected based on thresholds.

Fitting Suggestions

- Don't say "no" until you know
- Aim for a fused, binaural image
- Targets only a place to start . . . Don't be surprised by less gain to the poorer ear
- Consider Serial Fittings
- Role of Advanced Features

Fitting Suggestions

- Don't say "no" until you know
- Aim for a fused, binaural image
- Targets only a place to start . . . Don't be surprised by less gain to the poorer ear
- Consider Serial Fittings
- Role of Advanced Features
- Proper role of Monaural, CROS & Bi-CROS



Dillon, 2012

If just one ear . . .

Agenda

- Binaural Hearing
- Asymmetrical SNHL
- Assumptions of Typical Fittings
- Types of Asymmetrical Profiles
- Fitting Suggestions (not rules)
- Outcome Measures
- Case Examples

Asymmetrical Fitting Questionnaire

- Question 1: How often do you wear:
  - Both devices: __most waking hours __at least 4 hours per day __occasionally __never
  - Better Ear Only: __most waking hours __at least 4 hours per day __occasionally __never
  - Poorer Ear Only: __most waking hours __at least 4 hours per day __occasionally __never
- (alternative for unilateral fitting) How often do you wear your hearing aid?
  - __most waking hours __at least 4 hours per day __occasionally __never
- Question 2: When using your hearing aid for your poorer ear, do you hear:
  - __one unified sound (if yes, where in the head: center, better ear, poorer ear)
  - __a mix of two sounds

Asymmetrical Fitting Questionnaire

- Question 3: When using your hearing aid for your poorer ear, what type of help does it provide?:
  - __understanding conversations in quiet situations
  - __understanding conversations in noisier situations
  - __telling where sound comes from
  - __identifying sounds in the environment
  - __a feeling of balance to my hearing
  - __reduces my tinnitus
  - __other: _____

Agenda

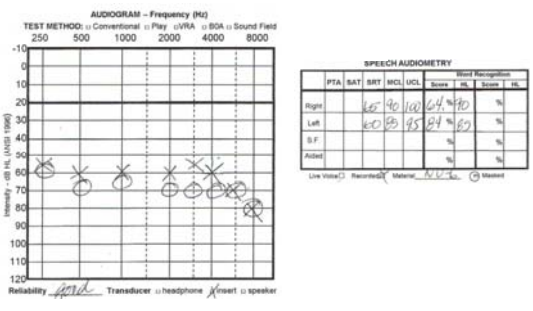
- Binaural Hearing
- Asymmetrical SNHL
- Assumptions of Typical Fittings
- Types of Asymmetrical Profiles
- Fitting Suggestions (not rules)
- Outcome Measures
- Case Examples

Fitting Suggestions

- Don't say "no" until you know
- Aim for a fused, binaural image
- Targets only a place to start . . . Don't be surprised by less gain to the poorer ear
- Consider Serial Fittings
- Role of Advanced Features
- Proper role of Monaural, CROS & Bi-CROS

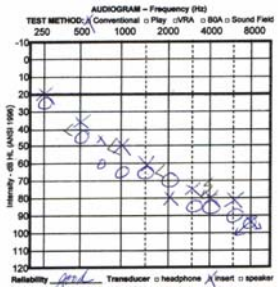
TF 52 yr old Female

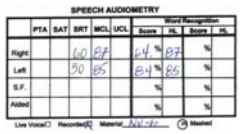
2012



WA 86 yr old Male

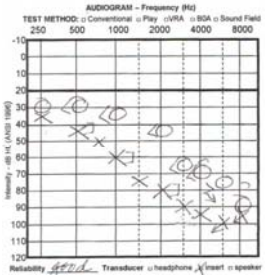
2012

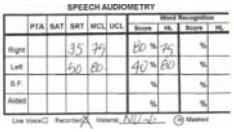




TR 75 yr old Male

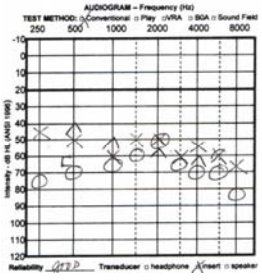
2012

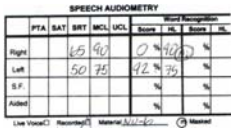




QL 68 yr old Male

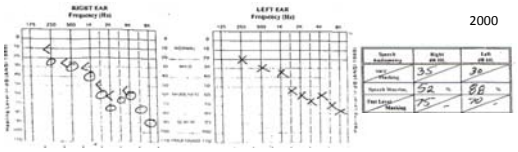
2011



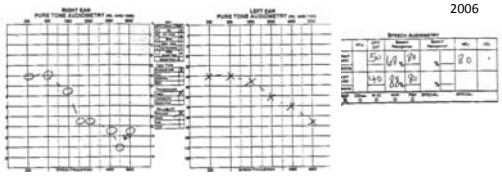


BR 71 yr old Female

2000

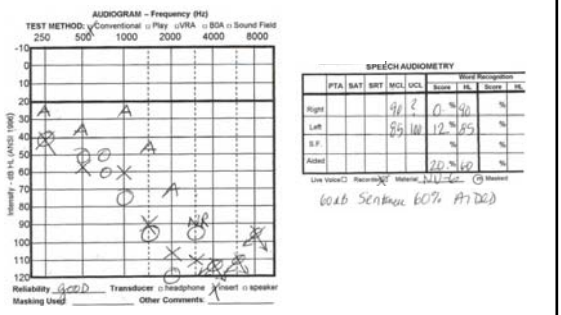


2006



BR 83 yr old Female

2012



SPEECH AUDIOMETRY

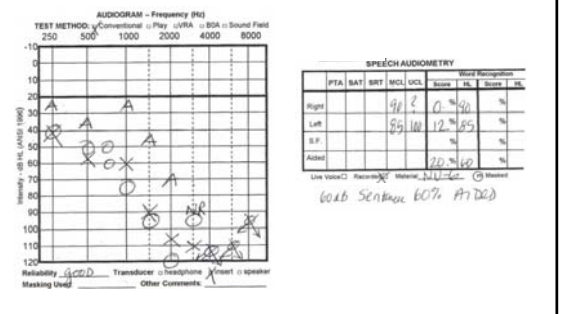
	PTA	SAT	SRT	MCL	UCL	Word Recognition Score	HL	Score	HL
Right				90	?	0 %	90		%
Left				85	100	12 %	85		%
S.F.						%			%
Aided						20 %	60		%

Live Voice Recorded Material NU-6 Masked

60dB Sentence 60% AIDED

BR 83 yr old Female

2012



SPEECH AUDIOMETRY

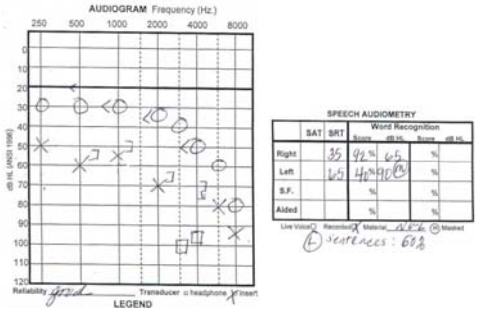
	PTA	SAT	SRT	MCL	UCL	Word Recognition Score	HL	Score	HL
Right				90	?	0 %	90		%
Left				85	100	12 %	85		%
S.F.						%			%
Aided						20 %	60		%

Live Voice Recorded Material NU-6 Masked

60dB Sentence 60% AIDED

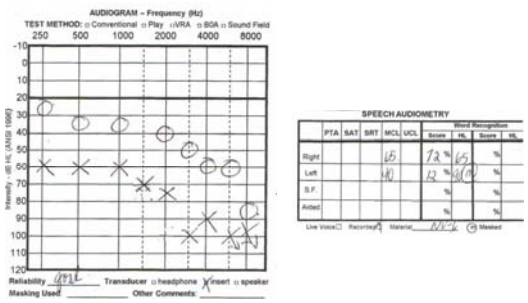
VT 75 yr old Female

2008



VT 79 yr old Female

2012



Asymmetrical Sensorineural Hearing Loss:

Fitting Strategies

Donald J. Schum, PhD
Vice President, Audiology & Professional Relations
Oticon, Inc.

DJS@Oticonusa.com